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Manual
Cube20 EtherNet/IP

Description

Installation

Characteristics

Startup

Diagnostics

Webserver

Technical Data

Publisher's Note

Product Manual for Cube20 BN-Ethernet/IP DI8 (Article Number: 56005)

Version 1.5

Version 06_11 DE

Article Number 56005

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Service and Support

Website:

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In addition, our Customer Service Center (CSC) will be glad to assist you:

The CSC supports customers over the entire course of the project, during planning and the conception of customer applications, configuration, installation, and startup. We also offer competent consulting or – in more complex cases – we even provide direct onsite support.

The CSC provides support tools. It performs measurements for fieldbus systems, such as Profibus DP, DeviceNet, CanOpen, and AS interface, as well as energy, heat, and EMC measurements.

Our coworkers at the Customer Service Center provide their competence, know-how, and years of experience. They are familiar with how products made of various hardware and software manufacturers interact.

You can contact the Customer Service Center at

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About the User Manual and its Structure

Bus Manual:
General explanations and functions for each bus.

On this subject, please click on the links to the next page.

System Manuals:
Describe the system in general and give an overview about the products, accessories and documentation.

Art. No.	Designation
56030	Cube 20 System

www.murrelektronik.com

Product Manuals:
Describe product-specific features.

Art. No.	Designation
56001	Cube20 BN-P DI8
56005	Cube20 BN-E DI8
56006	Cube20 BN-PNIO DI8
56035	Cube20 Expansions

www.murrelektronik.com

Here are links to the bus user manuals:

>>> ODVA (www.odva.org)

Table of Contents

Publisher's Note 2
Service and Support 3
About the User Manual and its Structure 4
Table of Contents 6
Important Information 9
1 Description of the Cube20 BN-E/IP DI8 Art. No. 56005 11
1.1 The Cube20 System 11
1.2 Features of the Cube20 BN-E/IP 12
2 Installation 13
2.1 Terminal Overview of the Cube20 BN- E/IP DI8 Art. No. 56005 13
2.2 Installation of a ETHERNET/IP network 14
3 Features of the Cube20 BN-E/IP 16
3.1 Cube20 BN-E/IP DI8 Art. No. 56005 16
3.1.1 Parameters 16
3.1.2 Restriction 16
3.2 I/O Data of Cube20 BN-E/IP DI8 Art. No. 56005 16
4 Startup 17
4.1 EDS File 17
4.2 Configuration Using RSLogix 5000 17
4.2.1 General Information 17
4.3 System Data 18
4.3.1 Components 18
4.3.2 Ethernet Cables 18
4.4 Information for First-Time Users 18
4.4.1 Requested Packet Interval (RPI) 19
4.5 Configuration Using the Murrelektronik Web Server 20

4.5.1 Principle Page Layout of Web Server 21
4.5.2 Determining the Data Length 22
4.6 Configuration in RSLogix5000 23
4.6.1 I/O Data Overview Configuration Using Expansion Modules 27
4.6.2 BN-E Internal System State 28
4.7 Factory Settings 29
4.8 Assigning and Setting the IP Address 29
4.8.1 Issuing with the Rotary Switch 29
5 Diagnostics 32
5.1 LED Indicators 32
5.1.1 Meaning of "Power" LED States 32
5.1.2 Meaning of "MS" LED States 34
5.1.3 Meaning of "NS" LED States 35
5.1.4 Power Supply Displays at Terminals 36
5.1.5 Signal-Logic Display and LED Behavior 37
5.1.6 LAN Port LEDs 38
5.2 Diagnostics via EtherNet/IP 39
5.2.1 Diagnostic Transmission with Acknowledgment 39
5.2.2 Diagnostics of Cube20 BN-E/IP and I/O Modules 40
5.2.3 Error Codes 41
5.3 Troubleshooting 43
5.3.1 Error Localization in the Ethernet/IP Network 43
6 The Murrelektronik Web Server 45
6.1 "Home" Menu Link 46
6.1.1 Menus for Slot 000 Bus Node 47
6.1.1.2 Slot 000 50
6.1.1.3 Slot 000 52
6.1.1.4 Slot 000 54
6.1.2 Menus from Slot 001 (Slot xxx) - Modules 63
6.2 "Help" Menu Option 67

6.2.1 Version Info 67
6.2.2 Help 68
7 Technical Data of 20 BN-E/IP DI8 Art. No. 56005 69
8 Accessories 71
Glossary 72
Legal Provisions 75

Important Information

Symbols and Icons

This manual contains information and instructions you must comply with in order to maintain safety and avoid personal injury or damage to property. They are identified as follows:

Notes indicate important information.

Warnings contain information that, if ignored, may cause damage to equipment or other assets or, if you fail to comply with safety precautions, may constitute a danger to the user's health and life.

➔ ***Refer to our catalog or visit our inline shop at www.murrelektronik.com.***

Intended Purpose

Before starting the devices, read this manual carefully. Keep it in a location that is accessible to all users at all times.

The products that are described in this manual were developed, manufactured, tested, and documented in compliance with the relevant safety standards. In normal cases, these products do not constitute any danger to persons or objects, provided the handling specifications and safety instructions described in this manual are observed. They meet the specifications of the European EMC Directive (2004/108/EC).

WARNING!

The devices are not safety devices conforming to the relevant standards. The safety functions of the system are no longer guaranteed.

- **Do not use the OFF state of the outputs to implement safety-related requirements of the system/machine.**

The products are designed for industrial use. An industrial environment is defined as one in which loads are not connected directly to the public low-voltage power grid. Additional measures must be taken if the products are used in private, business, or trade environments.

The safe, troublefree functioning of the products requires proper transportation, storage, mounting, and careful operation. Operation of the devices for their intended purposes is only guaranteed when the enclosures are fully mounted. If aggressive media are used, check their material resistance depending on the application.

Current safety and accident prevention laws valid for a specific application must be observed for the configuration, installation, setup, maintenance, and testing of the devices. The power supply must comply with SELV or PELV. Power sources in accordance with EN 61558-2-6 (transformer) or EN 60950-1 (switched-mode power supply) meet these requirements.

Only use cables that meet the requirements and regulations for safety, electromagnetic compatibility, and, if necessary, telecommunications terminal equipment specifications.

Qualified Personnel

Only qualified, trained electricians knowledgeable in the safety standards of automation systems may configure, install, set up, maintain, and test the devices. The requirements concerning qualified personnel are dependent on the requirements profiles described in ZVEI and VDMA. For this reason, electricians must know the contents of the manual "Weiterbildung in der Automatisierung" (Further Training in Automation Systems) issued by ZVEI and VDMA and published by Maschinenbau-Verlag, Post Box 710864, 60498 Frankfurt, Germany) before installing and maintaining the devices. They are therefore electricians who are capable of assessing the work executed and any possible dangers arising from this due to their professional training, knowledge, experience, and their knowledge of the pertinent standards; or who have a level of knowledge equivalent to professional training due to their many years of activity in a comparable field.

Only Murrelektronik technical personnel are allowed to execute work on the hardware and software of our devices, if they are devices not described in this manual.

WARNING

Unqualified tampering with the hardware or software, or failure to observe the warnings cited in this manual may result in severe personal injury or damage to property.

1 Description of the Cube20 BN-E/IP DI8 Art. No. 56005

1.1 The Cube20 System

The Cube20 System is an I/O system for use IP20 zones for the decentralized capture and control of digital and analog process parameters. It consists of a fieldbus-specific bus node and fieldbus-independent I/O modules that are linked to the bus node via an internal system connection. Please note the galvanic isolation between the input for the system power supply and the input for the sensor and actuator power supplies.

To maximize electromagnetic compatibility, we recommend implementing galvanic isolation.

Sensors (UI) and actuators (UA) can be powered by a common power supply unit. However, we recommend a separate power supply for system electronics (UB), sensors (UI), and actuators (UA) in order to maximize the electromagnetic compatibility of the overall system.

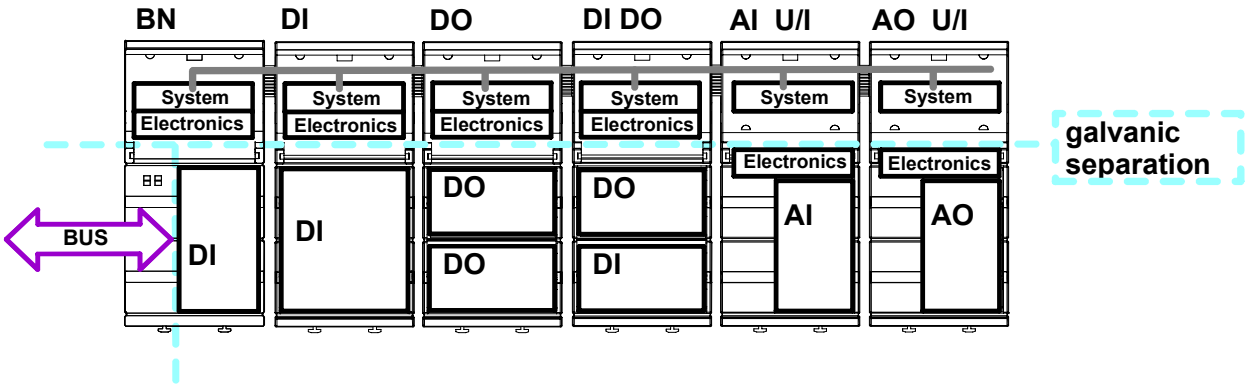


Fig. 1 Typical system setup with galvanic isolation

Figure 1 shows a typical system setup of the Cube20 with digital inputs and outputs (DI / DO) and analog inputs and outputs (AI / AO).

Fig. 1 explains that the EtherNet/IP, the I/O power supply, and the system electronics power supplies are galvanically isolated from each other. The internal electronics of the digital I/O modules are powered over the system cable, i.e. by the bus node. The internal electronics of the analog I/O modules are powered from the I/O power supply.

Information on the analog I/O modules:
Always connect the I/O power supply to guarantee communication for all analog modules via the internal system connection.

1.2 Features of the Cube20 BN-E/IP

- Data length of 500 bytes input data (Assembly Instance 100dec)
- 496 bytes output data (Assembly Instance 112dec),
- Parameterization/visualization via the web server
- Diagnostics in the useful data

2 Installation

2.1 Terminal Overview of the Cube20 BN- E/IP DI8 Art. No. 56005

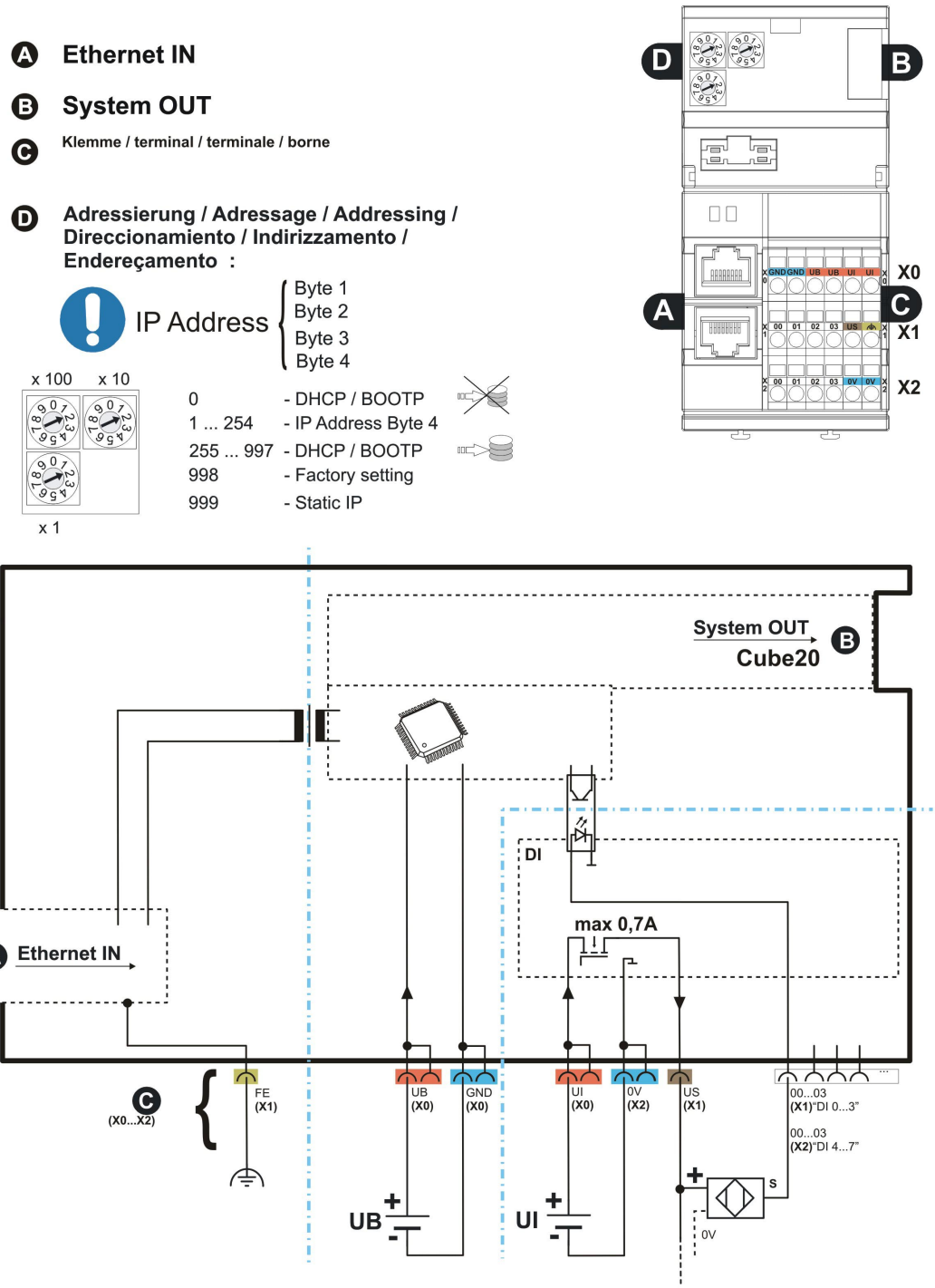


Fig. 2 Terminal overview of Cube20 BN-E/IP DI8 Art. No. 56005

➔ ***For expansions, we recommend our voltage terminal block Art. No. 56109.***

For more details, please refer to the voltage terminal blocks in the Product Manual.

Refer to our catalog or visit our online shop at www.murrelektronik.com

2.2 Installation of a ETHERNET/IP network

The Cube20 modules can be integrated as a star or linear topology for the Ethernet / IP network.

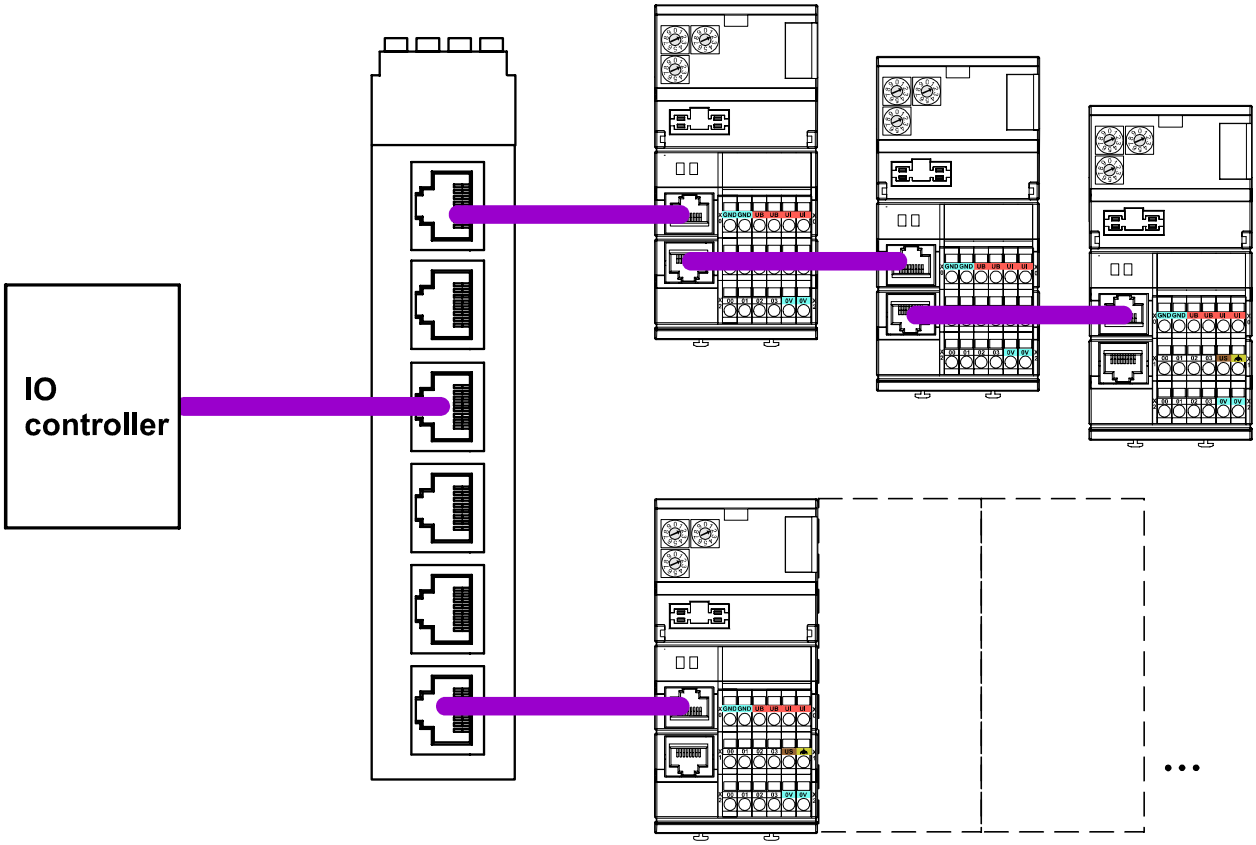


Fig. 3 ETHERNET/IP system structure in a star topology

The Cube20 module contains two RJ45 female connectors for Ethernet / IP. One female connector supplies, the other drags on the Ehternet / IP.

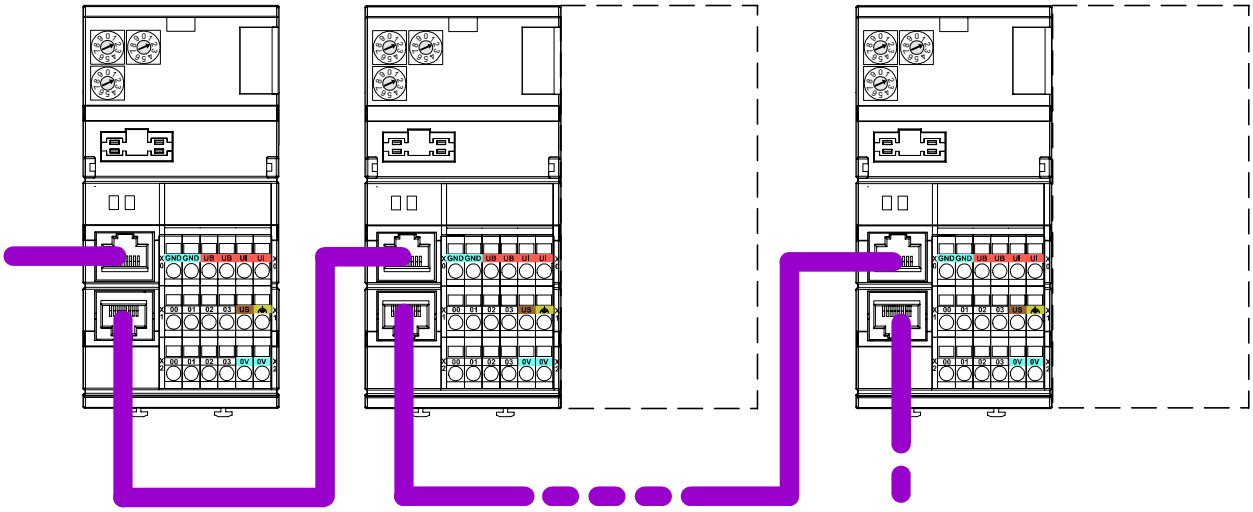


Fig. 4 ETHERNET/IP system structure in a linear topology

Please note the signal delays of the switches for linear topology.

3 Features of the Cube20 BN-E/IP

This section describes the main features of the Cube20 BN-Ethernet/IP in detail.

3.1 Cube20 BN-E/IP DI8 Art. No. 56005

3.1.1 Parameters

Bus nodes and connected Cube20 modules are configurable over a web server. The web server is accessible using the bus node IP address:

Address http://IP-Adresse

Format xxx.yyy.zzz.aaa

3.1.2 Restriction

Cube67 modules Art. Nos. 56752 and 56761 are not operable on Cube20 BN-E/IP DI8 bus nodes.

3.2 I/O Data of Cube20 BN-E/IP DI8 Art. No. 56005

Bit Assignment of Input Data PAE I/O Data

Byte 0								
Bit	7	6	5	4	3	2	1	0
Terminal	X2 03	X2 02	X2 01	X2 00	X1 03	X1 02	X1 01	X1 00

Tab. 1: Input data of Cube20 E-DP DI8 Art. No. 56005

4 Startup

4.1 EDS File

The EDS file is required to operate the devices described in this manual, dependent on the configuration tool used.

EDS-Vx.x-Murrelektronik-56005.eds

Import the EDS file to the appropriate configuration tool before starting up the device.

➔ ***The ESD file is downloadable from the Murrelektronik website:***
www.murrelektronik.com

4.2 Configuration Using RSLogix 5000

This section describes how to configure and parameterize a Cube20 BN-E/IP, using the example of RSLogix 5000 from Rockwell Automation Deutschland. The RSLogix 5000 Version 17 is used in the description.

4.2.1 General Information

Configuring a EtherNet/IP device is necessary to define the I/O data quantity and reserve the addresses in the controller.

The quantity of I/O bytes and the number of assembly instances are indicated on the web server. The controller also requires the IP address of the Ethernet/IP device.

4.3 System Data

4.3.1 Components

An Ethernet/IP network comprises at least the following components:

- one bus master (PLC)
- one or several slave users
- Ethernet cables and plugs to connect the users
- one or several bus segments connected via switches.

4.3.2 Ethernet Cables

Use only 100base TX cables specified in IEEE 802.3u with at least one cable type of CAT5 (EIA/TIA-568) to guarantee reliable communication.

4.4 Information for First-Time Users

Ethernet/IP is based on a generator/receiver communication model that allows the multicast Ethernet communication to achieve rapid report-by-exception replies.

Connection to the controller in an Ethernet/IP network is exclusively by means of Fast Ethernet switches (100 Mbit/s). Remember that the maximum cable length is 100 m to the end point if no auxiliary resources are used. The bus node includes a 2-port switch.

Switches send multicast messages to all switch ports and then behave like a hub. When unmanaged switches are used, it means that the more multicast users (Ethernet/IP users) are added to the system, the higher the multicast traffic for the users. This is why a higher bandwidth is used in the network. The results are longer response times, since every user must supply more CPU power to view and reject messages that are not addressed to the user.

If the number of messages processed is excessive, the user may be subject to an overload; missing replies may be at the incorrect RPI speed, and ultimately this may lead to an interruption in communication. This overload condition can be affected by either the PC/PLC scanner or the I/O user.

It is therefore advisable to divide the entire network into several segments by means of several switches. As a result, high-speed networks can be uncoupled from time-uncritical systems by selecting the suitable RPI time and switches.

Please remember that, with Ethernet/IP, unmanaged switches should only be used in small isolated systems (systems that are not connected to the corporate network or program-wide networks). Managed switches are recommended for medium-size and large high-speed control systems.

To manage multicast traffic, the switch must support the IGMP snooping function. A virtual LAN switch function or the use of routers is required to connect a control system to a large plant or corporate network.

For additional information, please contact the ODVA at www.odva.org.

In time-critical applications (RPI < 10 ms), we recommend the use of managed switches.

4.4.1 Requested Packet Interval (RPI)

When an Ethernet/IP system is set up, the RPI value must be carefully set in the control scanner. Depending on the manufacturer instructions, this value lies within the range of 1 ms to several 100 ms. The RPI value determines the speed at which the scanner sends Ethernet/IP packets. It also determines the maximum speed at which the bus node sends packets.

The value set in the PC/PLC scanner is also transferred to the bus node during the connection initialization phase so that the system runs on the same time base. Besides setting the speed for data updates, the RPI value also sets the speed at which the scanner expects on-time reception.

If the RPI time setting is too low, a higher network load is produced automatically. As a result, the bus node also requires more time to process the inquiries due to the now higher network load. This also affects packets that are not addressed to the bus node itself since the packets must still be received and rejected.

This leads to an overload condition in which the bus node can no longer execute its internal processes and the required RPI time can no longer be fulfilled.

If telegram reception exceeds minimum 4 times the RPI time setting, the controller interrupts I/O communication and switches to error condition.

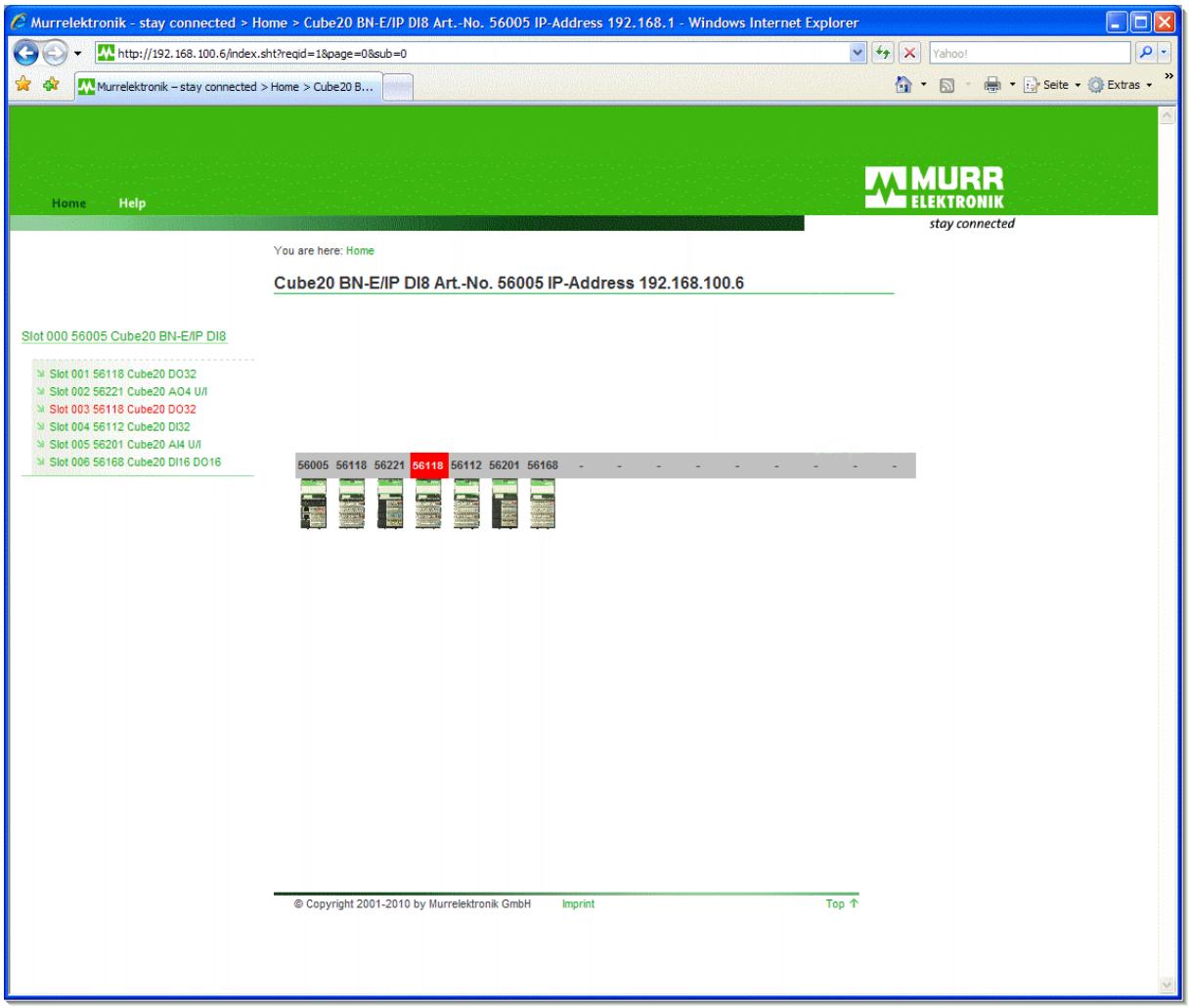
We recommend the shortest RPI time of 2 ms.

4.5 Configuration Using the Murrelektronik Web Server

You can only configure the Cube20 system using the web server. The configuration tools of the manufacturers of the master devices currently support no configuration or parameterization feature.

The I/O data lengths are automatically determined during runup and can be recorded via the web server by means of the module configuration (Art. No. + number of modules + parameters).

Please refer to the link "***Parameters/Slot 000" in the "I/O Length" menu*** (Section 6.1.1.3). All examples were produced using the Murrelektronik web server and RSLogix5000 Version 17 from Rockwell Automation.


Murrelektronik - stay connected > Home > Cube20 BN-E/IP DI8 Art.-No. 56005 IP-Address 192.168.1 - Windows Internet Explorer
http://192.168.100.6/index.sht?reqid=1&page=0&sub=0
Murrelektronik – stay connected > Home > Cube20 B...
Home
Help
MURR ELEKTRONIK
stay connected
You are here: Home
Cube20 BN-E/IP DI8 Art.-No. 56005 IP-Address 192.168.100.6
Slot 000 56005 Cube20 BN-E/IP DI8
Slot 001 56118 Cube20 DO32
Slot 002 56221 Cube20 AO4 U/I
Slot 003 56118 Cube20 DO32
Slot 004 56112 Cube20 DI32
Slot 005 56201 Cube20 AI4 U/I
Slot 006 56168 Cube20 DI16 DO16
56005 56118 56221 56118 56112 56201 56168
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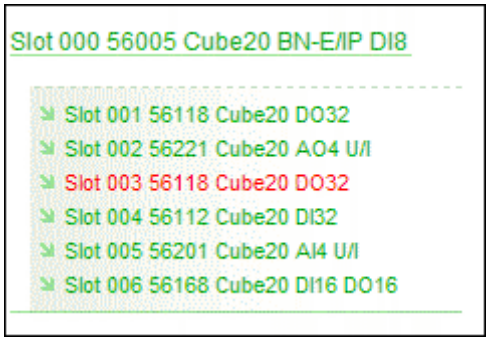
Imprint
Top

Fig. 5 Murrelektronik web server and RSLogix5000

4.5.1 Principle Page Layout of Web Server

Left page on screen



The I/O module slots are identified by a consecutive number 'Art. No.' and a module designation.

Slot 000 56005 Cube20 BN E/IP	The system topology starts with the bus node which is always located at Slot 000.
Slot 001 56168 Cube20 DI16DO16	This is followed by the modules in the sequence in which they occur in the system.
Color coding of modules	Green: OK Red: Module has diagnostic feature. Red + struck through: Module was removed from system.
Right side of screen	A left-click on the module displays the module status on the right, or additional setting options for this module.

4.5.2 Determining the Data Length

Access this submenu via the "***Parameters"*** link; click on "**Slot 000“** and change to the tab "***I/O Length***".

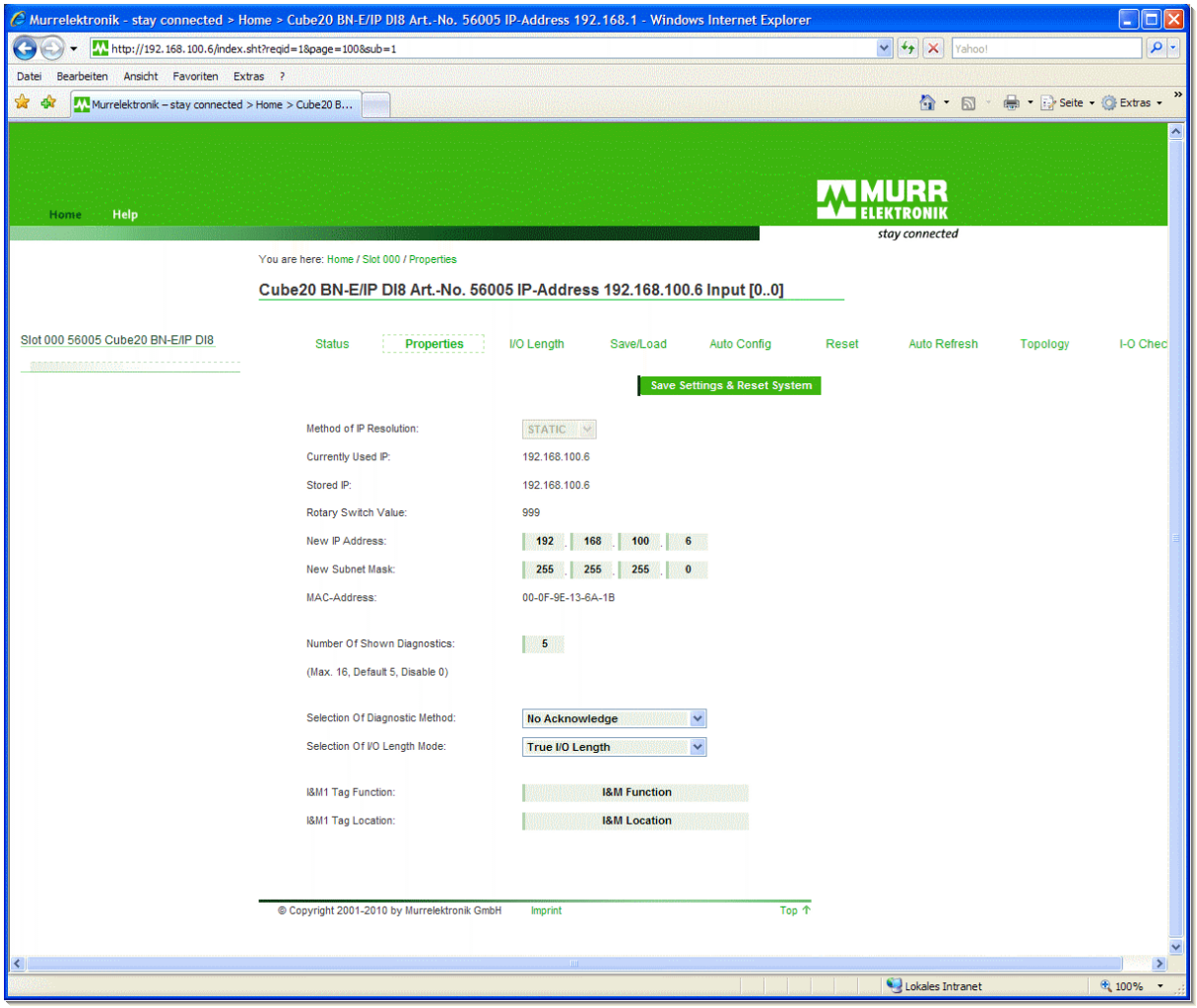


Fig. 6 Display of data length of Cube20 system

To improve the overview, data lengths are displayed separately according to their associated assembly instance with their data range and data lengths. The assembly instance and the associated data length must then be entered in the configuration tool RSLogix5000 from Rockwell Automation, as shown in the figure.

The Cube20 System for Ethernet/IP detects automatically all connected modules and puts each of them in service independently of the fieldbus.

“Setting the diagnostic length”
Set the diagnostic length under "Properties". Note: This has a direct influence on the length of the input data in the entire system.

From software version 1.04:
“Setting even data lengths”
You can change odd data lengths to "even" data lengths under "Properties" / "Selection of I/O Length Mode. The added byte is inserted between module I/O data and the bus node control / state.

4.6 Configuration in RSLogix5000

The procedure may vary depending on the controller used. In this example, a CompactLogix from Allen Bradley is used.

Open Backplane in RSLogix5000 in the menu "***I/O Configuration***" and your Ethernet port.

Right-click on "***New Module"***.

The screen below appears:

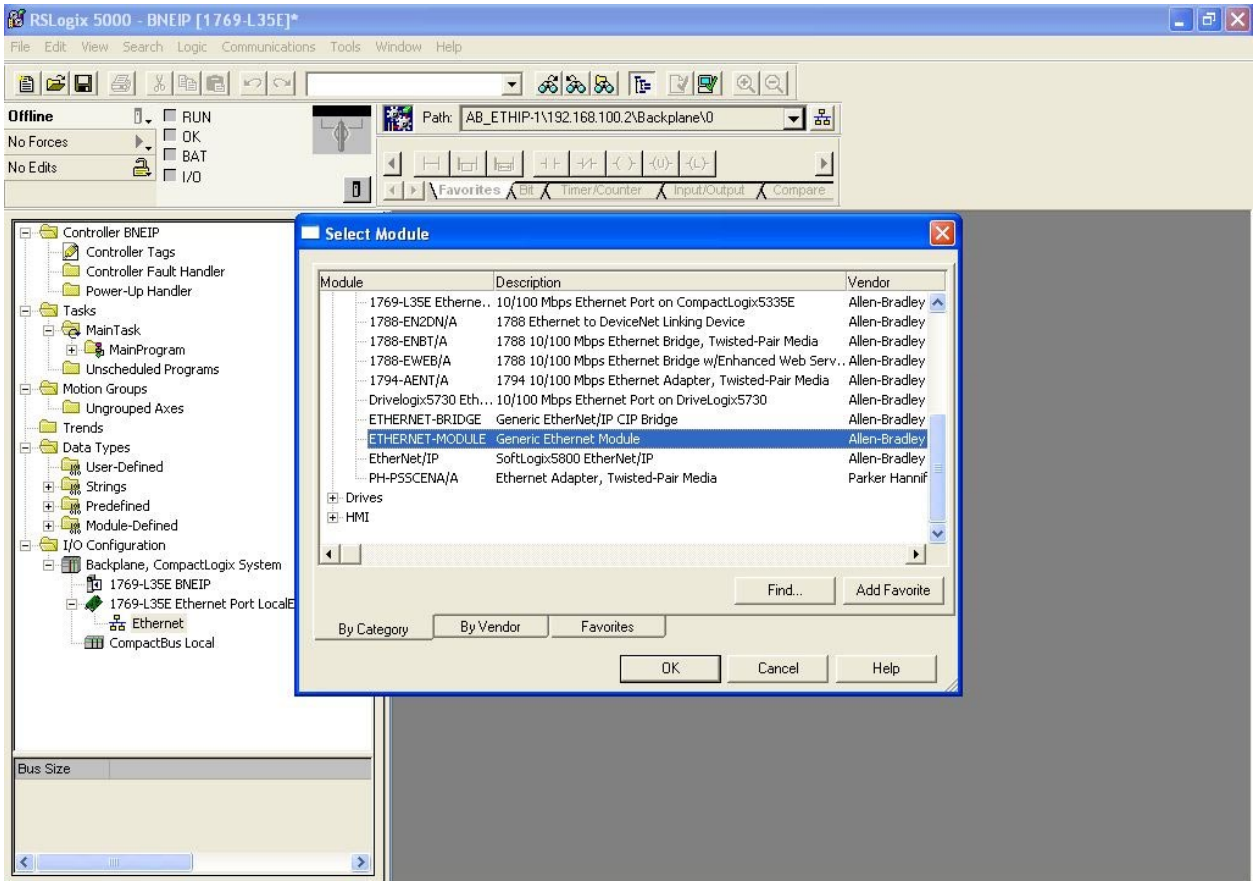


Fig. 7 RSLogix5000 Generic Ethernet Modules

Expand the "***Communications"*** menu option and select the modules "***Ethernet Module – Generic Ethernet Module"***.

Please make sure that you choose the option "Ethernet Module - Generic Ethernet Module" in the I/O configuration in RSLogix!

Enter the necessary parameters in the "Favorites" tab in "***Module Properties***".

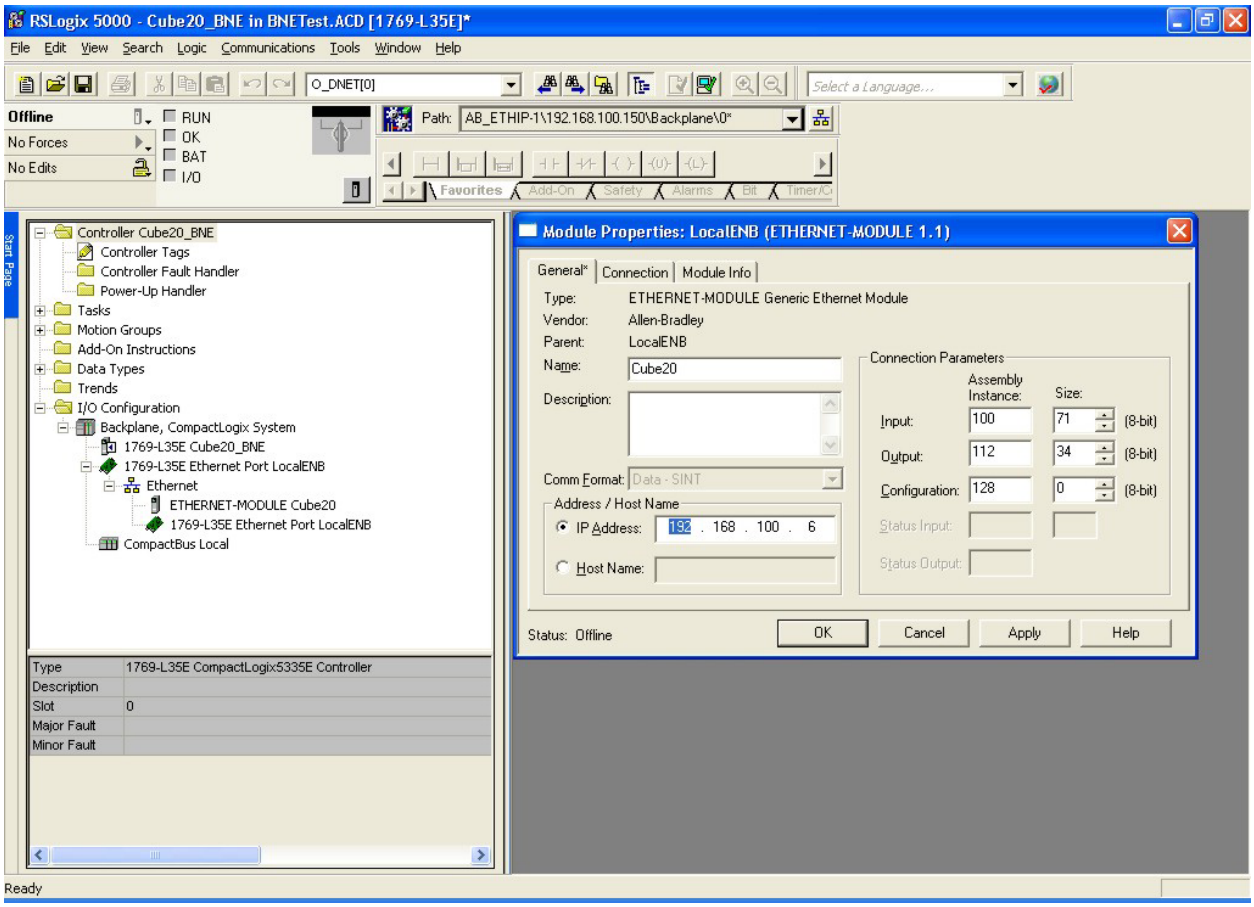


Fig. 8 RSLogix – Entering data lengths

The bus node uses the following instances:

- Inputs: Assembly Instance 100_{dec}
- Outputs: Assembly Instance 112_{dec}
- Configuration: Assembly Instance 128_{dec}

Please note that instance 128dec is not supported for the configuration and therefore Size must always be ZERO!

See Section 4.5.2 on how to determine the data lengths in the Cube20 Systems.

Please note that the bus node calculates the data lengths in bytes. For this reason, make sure you set the correct data type, in our example SINT (8 bits).

Set the RPI time in the "***Connection"*** tab. The default RPI is 10 ms. Refer to Section 4.4.1 for explanations on further procedures.

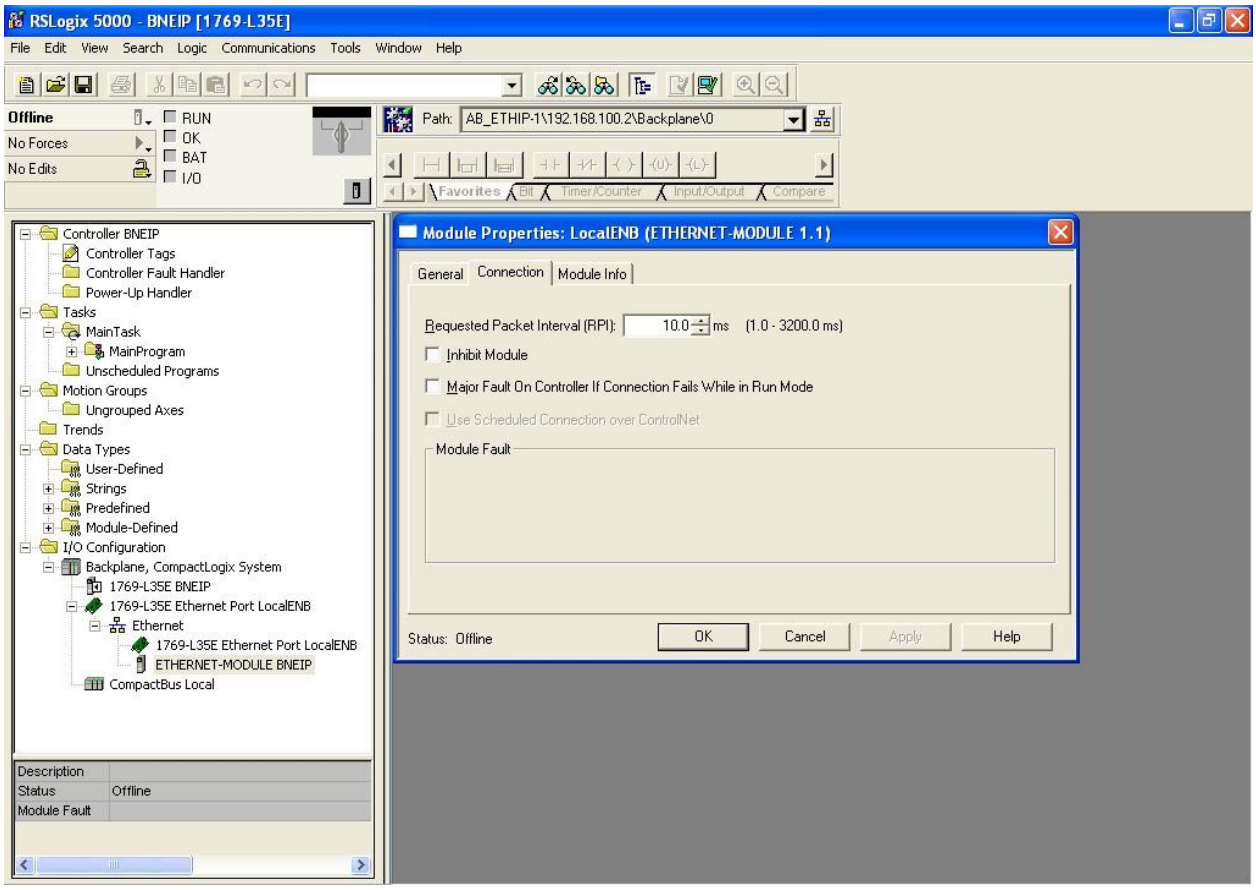


Fig. 9 RSLogix 5000 - Setting the RPI Time

When you have completed all the settings, click on the "OK" button. Click on the "Offline" button and download the configuration to the controller. Based on the previous data settings, the controller verifies the correct data lengths and instances, and if correct, sets up the connection to the bus node. The bus node then switches the NS-LED to static green.

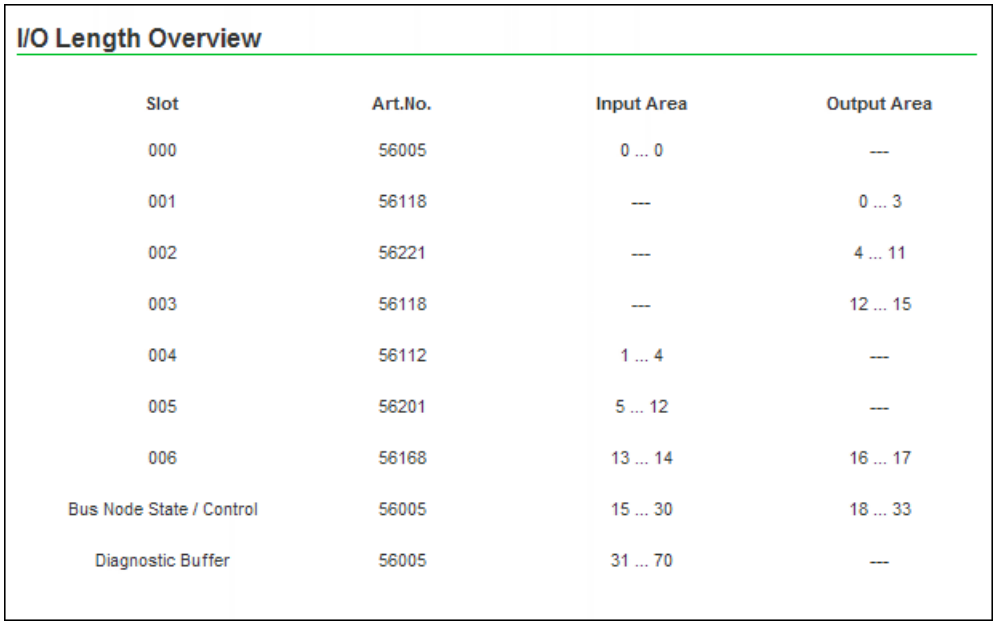
Configurations that require RPI times under 10 ms must first be tested for correct operation.

The minimum RPI time supported on the Cube20 BN-E is 2 ms.

4.6.1 I/O Data Overview Configuration Using Expansion Modules

Input	Slot	Art. No.	Module Type	Output
Byte				**Byte**
0 to 0	000	56005	BN-E/IP DI8	-
-	001	56118	Cube20 DO32	0 to 3
-	002	56221	Cube20 AO 4 U/I	4 to 11
-	003	56118	Cube20 DO32	12 to 15
1 to 4	104	56112	Cube20 DI32	-
5 to 12	105	56201	Cube67 AI 4 4xM12 (I)	-
13 to 14		56168	Cube20 DI16 DO16	16 to 17
-	BN-E	56005	BN-E (Diag. Acknowledge)	18 to 19
15 to 15	BN-E	56005	BN-E Internal System State	-
16 to 30	BN-E	56005	BN-E Reserved	20 to 33
31 to 70	BN-E	56005	BN-E (Diagnostic buffer with 5 inputs)	-

Tab. 2: I/O data overview of configuration with expansion modules



I/O Length Overview

Slot	Art.No.	Input Area	Output Area
000	56005	0 ... 0	---
001	56118	---	0 ... 3
002	56221	---	4 ... 11
003	56118	---	12 ... 15
004	56112	1 ... 4	---
005	56201	5 ... 12	---
006	56168	13 ... 14	16 ... 17
Bus Node State / Control	56005	15 ... 30	18 ... 33
Diagnostic Buffer	56005	31 ... 70	---

Fig. 10 Display of I/O data overview of configuration with expansion modules in web server

4.6.2 BN-E Internal System State

The Internal System State shows the state of internal communications. In normal mode, the value is "1".

Value	State
1	Internal communication OK
127	No communication to at least one module.

Tab. 3: State of internal communication

4.7 Factory Settings

The factory settings are:

Description	Value
Method of IP Resolution	DHCP
Currently Used IP	192.168.100.6
Stored IP	192.168.100.6
Subnet Mask	255.255.255.0
Number Of Shown Diagnostics	5
Selection of Diagnostic Method	No Acknowledge
Selection of I/O Length Mode	True I/O Length
I&M 1 Tag Function	I&M Function
I&M1 Tag Location	I&M Location

Tab. 4: Factory settings

There is no stored configuration in the device. The factory settings can be restored by setting the rotary switch to "998".

4.8 Assigning and Setting the IP Address

4.8.1 Issuing with the Rotary Switch

Set the operating mode using the three rotary switches to obtain the modules' IP address:

When issuing addresses, please note the following:
Every Ethernet user must be assigned an unambiguous and unique IP address in the network.

Position/Range	Settings
Position 0:	IP address request per DHCP (default), or BOOTP without saving ( )
Range 1 to 254:	Setting the last byte of the IP address (default 192.168.100.xxx)
Range 255 to 997:	IP address request per DHCP (default), or BOOTP with saving ( ) The search for an IP address only takes place if the setting DHCP or BOOTP was selected in the web server (Slot 000 / Properties). If STATIC was selected, the stored IP address is used.
Position 998:	Accept factory settings
Position 999:	Use static IP (default 192.168.100.6)

Tab. 5: Setting the IP address using the rotary switches

It is only possible to set the DHCP and BOOTP modes to refer to the IP address in the web server.

Note down the MAC ID printed on the underside of the housing and set the rotary switches to the required positions. Boot your DHCP or BOOTP server and assign the required IP address to the modules' MAC ID that you noted down earlier. After the system is booted, start the service you require depending on the service you selected, and fetch the IP address from the server. If you saved the IP addresses, set all rotary switches to "999", otherwise this service is re-executed after every reboot.

The BCD rotary switch settings are loaded once after applying the power supply. Any change only becomes effective after a power reset. If you want to use a saved IP address, set the BCD rotary switch to 999.

When you issue an IP address or a subnet mask, make sure it corresponds to your actual network configuration. If you make a false input, you may no longer be able to reach your module under certain circumstances. Therefore, first contact your system administrator!

If the
IP address is obtained from a DHCP/BOOTP server, the bus node requests an IP address only within 60 seconds after switchon. Make sure that a DHCP/BOOTP server is running when the bus node is switched on.

Switch position "255 to 997**"**

Use this switch position when you want to store the IP address in the bus node and obtain the address from a BOOTP or DHCP server. It is then possible to switch over the bus node to static IP address. The stored IP address is used. Use the web server to perform the switchover.

If you set the bus mode to a static IP address, the device expects an address to be issued by a DHCP/BOOTP server every time the device is switched.

Switch position "998"

The bus node factory settings are reactivated in switch position "998". The IP configuration, the I/O module settings, the diagnostic methods, and the number of diagnostic buffers are reset.

5 Diagnostics

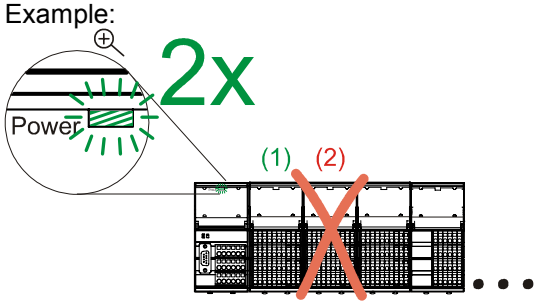
5.1 LED Indicators

5.1.1 Meaning of "Power" LED States

The "Power" LED indicates the state of the Cube20 system voltage and internal communication.

Fig. 11 Power LED on Cube20 modules

Response of Power LED on Cube20 BN Modules

Color		Meaning for Power LED	Remedial Action
	green	System voltage (>12V) applied	
	flashes green	System link interrupted in the Cube20 System. Number of flash pulses corresponds to the position of defective expansion module (e.g.: 1 to 15). with several modules, the nearest.	Exchange of affected and previous module and power reset at Terminal UB
		Example: 	
	off	No system voltage (>12V)	Raise system voltage

Tab. 6: Response of power LED on Cube20 BN modules

Important: I/O data in case of interrupted CUBE20 system link

If there is an interruption in the CUBE20 system link, the I/O data are reset to zero on all modules. The data in the diagnostic buffer of the bus node are retained and indicate the current status.

WARNING

Devices from the Cube20 series are not safety devices conforming to the relevant standards.

Do not use the OFF state of the outputs to implement safety-related requirements of the application.

5.1.2 Meaning of "MS" LED States

The "Module Status" LED indicates the state of the Cube20 System on the Cube20 ETHERNET/IP DI8 Art. No. 56005.

Fig. 12 Run-LED on Cube20 ETHERNET/IP DI8 Art. No. 56005

LED Display	Response	State
	lights up continuously (green)	OK
	flashing (red)	Cube20 E/A module configuration changed
	lights up continuously (red)	Cube20 I/O module failure
	off	Voltage at terminal UB too low (<12 V)

Tab. 7: Run-LED on Cube20 ETHERNET/IP DI8 Art. No. 56005

5.1.3 Meaning of "NS" LED States

The "Network Status" LED indicates the state of a correct/incorrect configuration on the Cube20 ETHERNET/IP DI8 Art. No. 56005.

Fig. 13 NS-LED on Cube20 ETHERNET/IP DI8 Art. No. 56005

LED Display	Response	State
	lights up continuously (green)	Communication with PLC
	off	No IP address
	flashing (red)	Timeout of link to PLC
	lights up continuously (red)	IP address issued twice

Tab. 8: NS-LED on Cube20 ETHERNET/IP DI8 Art. No. 56005

5.1.4 Power Supply Displays at Terminals

Module Power Supply

The status of the operating voltage UB is shown by the indicator under the terminal.

- The LEDs under **"UI"** indicate the status of the sensor power supply voltage.
- The LEDs under **"UB"** indicate the status of the module operating voltage.

LED Display UI	Response	State
	green	Power supply OK (>= 18 V)
	red	Undervoltage (< 18 V)
	off	Voltage <= 12.5V

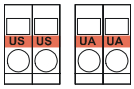
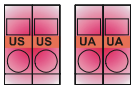
Tab. 9: LED module power supply

LED Display UB	Response	State
	green	Power supply OK (>= 18 V)
	red	Undervoltage (< 18 V)
	off	Voltage <= 12.5V

Tab. 10: LED electronics power supply

Peripheral Power Supply

- The LEDs under **"US"** indicate the status of the sensor power supply voltage.
- The LEDs under **"UA"** indicate the status of the actuator power supply voltage.
- The LEDs under **"UB"** indicate the status of the electronics power supply voltage.

LED Display US and UA	Response	State
	off	Power supply OK
	red	Overload or short-circuit of sensor or actuator power supply

Tab. 11: LED periphery power supply

The "US" LED is not designed individually for each terminal.

5.1.5 Signal-Logic Display and LED Behavior

Digital Input Modules

Each input and output is assigned a separate status display It is labeled **"00 to 03"** or **"00 to 07"**. The label indicates the channel number and bit position. It is arranged under the associated terminal and assigns the status of the peripheral components.

Relationship of signal-logic display and LED behavior at the input

LED Display		Logic Value	Voltage at Input	Signal
	off	0	0 V	Input with NO contact function
	yellow	1	24 V	

Tab. 12: LED at input of digital modules

5.1.6 LAN Port LEDs

Two diagnostic LEDs on the RJ45 connection socket signal the current EtherNet/IP state.

Fig. 14 LEDs on the RJ45 connection socket

LED	Display	Status	Description
LAN PORT LINK green	Status of line connection	ON	Line connection to switch or another Ethernet user OK
		OFF	No line connection
LAN PORT ACTIVITY orange	Data traffic on the lines	OFF	No data traffic
		flashing	Data being transmitted

Tab. 13: LEDs on the RJ45 connection socket

5.2 Diagnostics via EtherNet/IP

5.2.1 Diagnostic Transmission with Acknowledgment

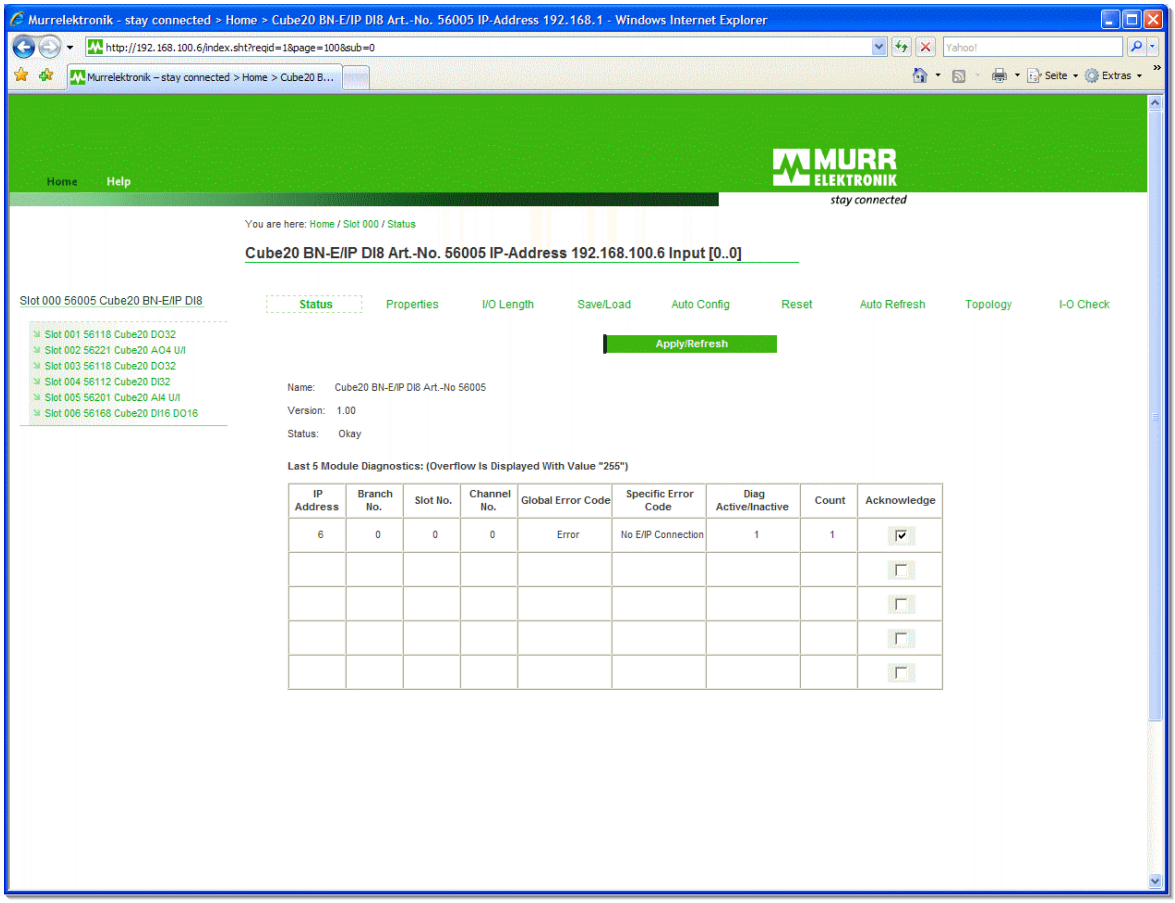


Fig. 15 Diagnostic with Acknowledgment

In this method, all diagnostics are saved and transmitted until the user acknowledges the diagnostic. Acknowledgment is by clicking on the appropriate diagnostic in the Acknowledgment field, or by using the Acknowledgment field in the output data. The Acknowledgment field is located directly after the output data in the 2 following bytes.

See the "***I/O Length***" menu option for an overview.

The Acknowledgment field is located directly after the output data in the 2 following bytes.

When a PLC connection is active, no output data are accepted by the web server. For this reason, no diagnostics can be acknowledged in this case via the web server.

5.2.2 Diagnostics of Cube20 BN-E/IP and I/O Modules

The module and channel diagnostics are transferred in the useful data.

The Channel number for module diagnostics is always "0".

The Branch No. is always "0" on Cube20 (see Fig. 15).

The slot numbers indicate the module position within the system.

5.2.3 Error Codes

Errors are indicated as text messages in the web server display.

5.2.3.1 Global Error Codes

Error Code No.	Meaning
1	Short-circuit
2	Undervoltage
6	Line break
7	Upper limit overshot
8	Lower limit overshot
9	Error (universal error)
16	Parameter error
255	Buffer overflow, diagnostic buffer overflow

Tab. 14: Global error codes

5.2.3.2 Specific Error Codes

Error Code No.	Meaning
1	Sensor short-circuit
6	Line break
7	Upper limit overshot
8	Lower limit overshot
16	Parameter error
23	Actuator warning
24	Actuator short-circuit
26	Diagnostics acc. to DESINA
40	Actuator power supply undervoltage
41	Actuator power supply not available
42	External actuator power supply undervoltage
43	External actuator power supply not available
50	Sensor power supply undervoltage

Error Code No.	Meaning
52	Power supply not available
86	Ethernet/IP connection not available. The error occurs when the scanner fails to respond to the bus node within approx. 5 mins after bus node switch-on or no connection is set up.
87	After the configuration is saved, a connected module configuration was changed. The error is cleared when the current configuration is saved or the configuration is deleted. A reset is required.
88	Link missing. Ethernet connection was lost (Ethernet cable removed).
89	PLC connection timeout. This error is set when a timeout occurs on a PLC connection. The error is cleared after every new connection set up.
99	The error is set when an I/O module fails in service.
255	Buffer overflow, diagnostic buffer overflow

Tab. 15: Specific error codes

5.3 Troubleshooting

This chapter contains possible error profiles and information that may assist you in troubleshooting.

5.3.1 Error Localization in the Ethernet/IP Network

This section lists the most frequent error sources when commissioning an Ethernet/IP network. The list does not claim to be complete. In particular, there are a number of useful diagnostic tools (line tester, Ethernet monitor, packet sniffer) made by various manufacturers to inspect correct installation.

Error Profile	Diagnostic	LED Indicators	Possible Cause	Remedial Action
User is not reachable or communication error	No slave response	NS-LED on bus node flashing. When the module has no power supply, all LEDs are off.	User has no power supply.	Supply user with power.
			No or incorrect IP address setting	Set correct address.
			No or incorrect subnet mask setting	Set suitable subnet mask for associated IP address.
			Address setting already used	Every Ethernet/IP user requires an unambiguous unique IP address:
			Segment incorrectly connected or inter-rupted	Since the NS-LED is still flashing, the downstream link to the next segment may be defective. Check the cables.
			Invalid RPI time	Check the RPI time at the PLC. Times below 10 ms must be checked for function before. Increment the RPI time stepwise until the overload condition is rectified.
			Expansion of Ethernet segment too great. Permitted line length is 100 m	Use a repeater to split a segment into several segments if the expansion is too large.
			Incorrect data length	Correct the data length setting of the appropriate instances in the configuration tool.

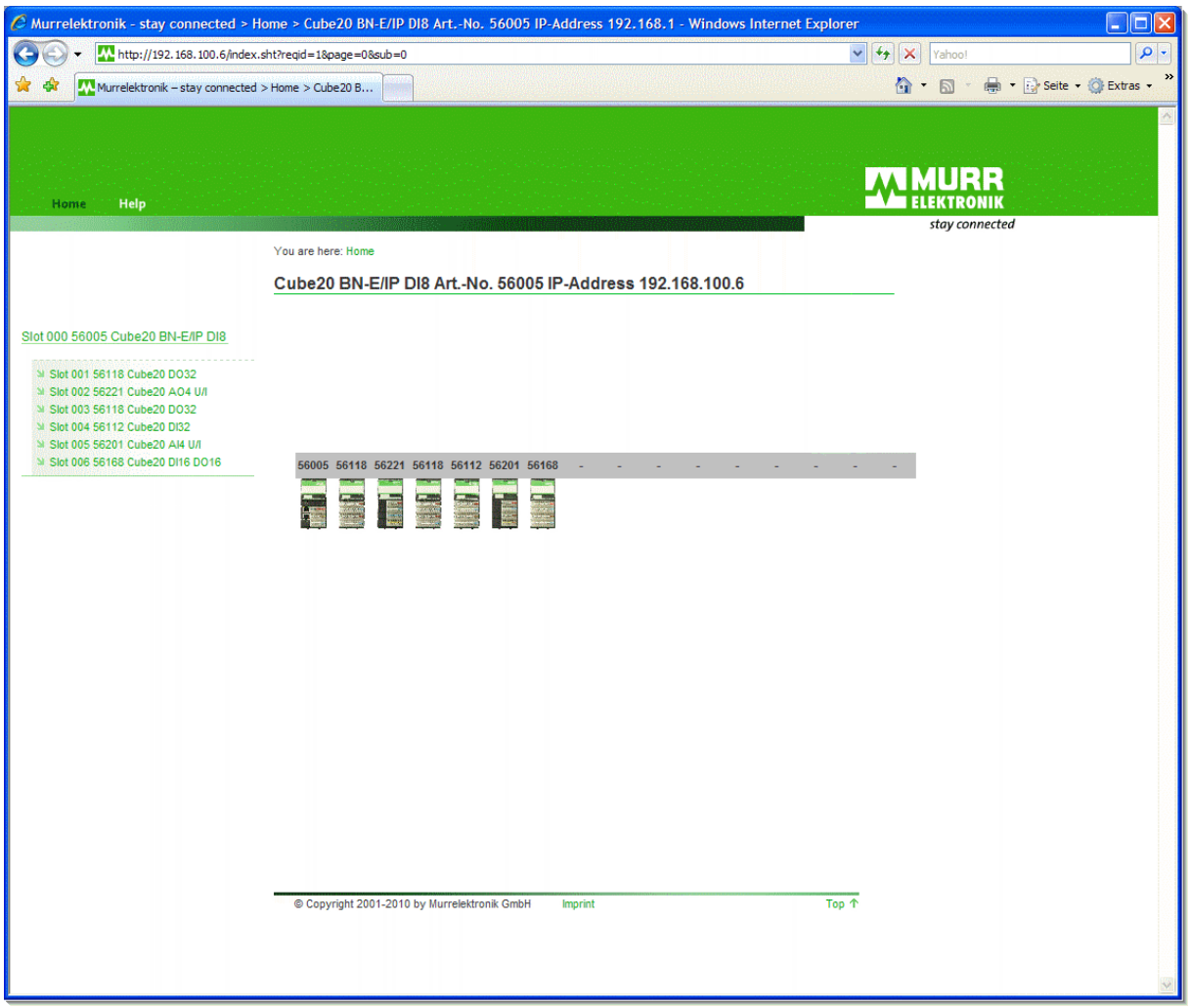
Error Profile	Diagnostic	LED Indicators	Possible Cause	Remedial Action
			Incorrect data types	Correct the data type settings of the appropriate instances in the configuration tool for SINT (bytes).
Connection to the Ethernet/IP Master was interrupted in service.	No slave response	NS-LED flashing	Short-circuit or interruption of Ethernet cable in remote segment	Check Ethernet cables or switches. Check which users are still reachable to localize the error location.
			IP address was changed in service	Perform correct configuration with new IP address; restart the system.
			Network overload	Check the network dimensioning.
Connection to the Ethernet/IP Master was interrupted in service.	No slave response	NS-LED off	Short-circuit or interruption of Ethernet cable at bus node	Check Ethernet cables and switches. Check which users are still reachable to localize the error location.
			No DHCP or BOOTP server available	Boot server.

Tab. 16: Error localization in the Ethernet/IP network

6 The Murrelektronik Web Server

You can only configure and parameterize the Cube20 system using the web server. The configuration tools of manufacturers of master devices currently support no configuration or parameterization feature.

The Murrelektronik web server is a graphic tool with which you can obtain information about your Cube20 system quickly and intuitively. It can be configured and parameterized to your requirements.


Murrelektronik - stay connected > Home > Cube20 BN-E/IP DI8 Art.-No. 56005 IP-Address 192.168.1 - Windows Internet Explorer
http://192.168.100.6/index.sht?reqid=1&page=0&sub=0
Murrelektronik – stay connected > Home > Cube20 B...
Home
Help
MURR ELEKTRONIK
stay connected
You are here: Home
Cube20 BN-E/IP DI8 Art.-No. 56005 IP-Address 192.168.100.6
Slot 000 56005 Cube20 BN-E/IP DI8
Slot 001 56118 Cube20 DO32
Slot 002 56221 Cube20 AO4 U/I
Slot 003 56118 Cube20 DO32
Slot 004 56112 Cube20 DI32
Slot 005 56201 Cube20 AI4 U/I
Slot 006 56168 Cube20 DI16 DO16
56005 56118 56221 56118 56112 56201 56168
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Top

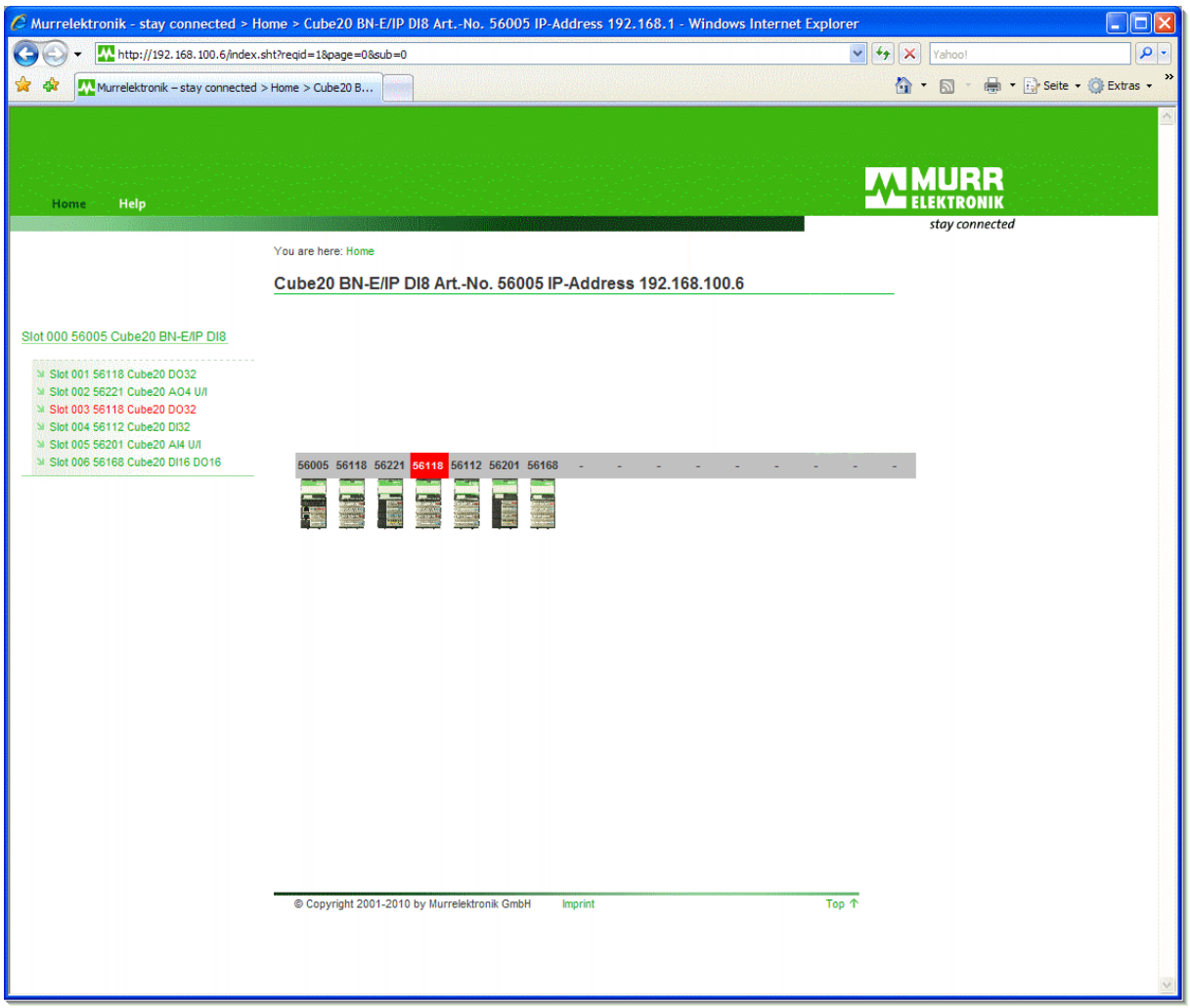
Fig. 16 Murrelektronik – stay connected > Home > Cube20 BN-E/IP DI8

6.1 "Home" Menu Link

After you boot the web server, the configuration overview is presented. This provides you with an overview of the modules currently connected. When you select this link, you return from any submenu back to the "***Home***" view.

In addition, you receive the information whether a diagnostic is present for a module by means of a color identification. The presence of a diagnostic is indicated by the module highlighted in red.

In case of an interruption in the internal system connection, the missing modules are highlighted in red and struck through.


Murrelektronik - stay connected > Home > Cube20 BN-E/IP DI8 Art.-No. 56005 IP-Address 192.168.1 - Windows Internet Explorer
http://192.168.100.6/index.sht?reqid=1&page=0&sub=0
Murrelektronik – stay connected > Home > Cube20 B...
Home
Help
MURR ELEKTRONIK
stay connected
You are here: Home
Cube20 BN-E/IP DI8 Art.-No. 56005 IP-Address 192.168.100.6
Slot 000 56005 Cube20 BN-E/IP DI8
Slot 001 56118 Cube20 DO32
Slot 002 56221 Cube20 AO4 U/I
Slot 003 56118 Cube20 DO32
Slot 004 56112 Cube20 DI32
Slot 005 56201 Cube20 AI4 U/I
Slot 006 56168 Cube20 DI16 DO16
56005 56118 56221 56118 56112 56201 56168
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Top

Fig. 17 "Home" menu link with diagnostic displayed

All modules, including bus nodes, are designated by slots. This is a unique assignment for every single module of their position within the Cube20 system. Starting with the bus node that is always Slot 000, other modules are designated according to their position in the system. The first module is positioned downstream of the bus node due to its designation Slot 001, Slot 002 is the second module, and Slot 003 is the third module, etc.

After you click on the Slot link, the individual submenus are displayed for every connected module, including the bus node. The submenus are explained in the following sections.

6.1.1 Menus for Slot 000 Bus Node

The navigation bar comprises the following clickable menu options:

- Status
- Properties
- I/O Length
- Save/Load
- Auto Config
- Reset
- Auto Refresh
- Topology
- I-O Check

The bus node always has the designation "Slot 000".

6.1.1.1 Slot 000 Status

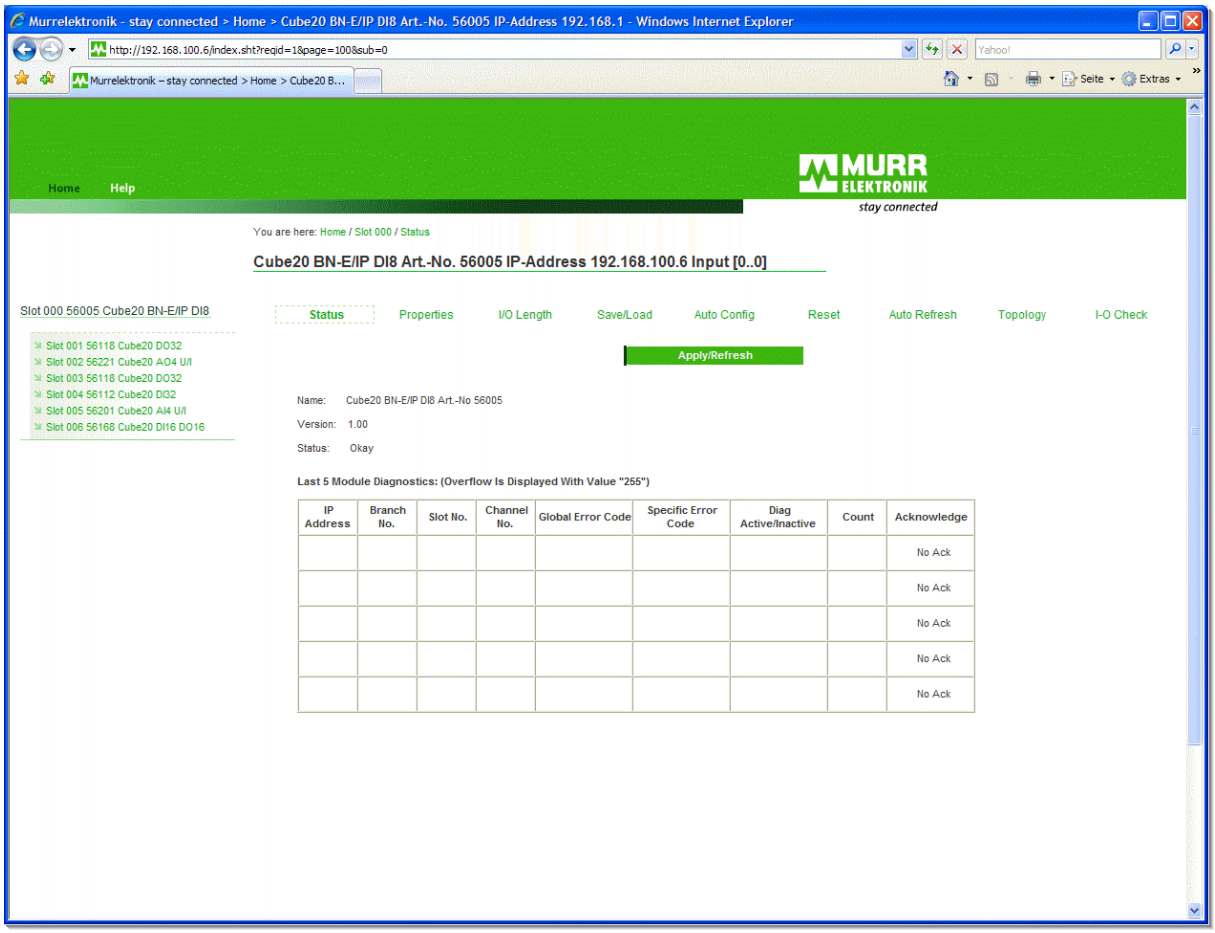


Fig. 18 Slot 000 - "Status" bus node

Display	Description	Selection
Name	Name of highlighted module	-
Version	Software version	-
Status	Module status	OK Faulty → Module has diagnostic. Failure → Module no longer present.

Tab. 17: Display on status page

Diagnostic Buffer

The table contains up to 16 diagnostics of the bus node and the connected modules. The buffer depth can be set in the "Properties" link. If there are more than 16 diagnostics in the Cube20 system, a diagnostic overflow is displayed. The message displayed is 255_{dec}. In case of a diagnostic overflow, older diagnostics are overwritten by new diagnostics. The diagnostic map is therefore no longer consistent.

Acknowledge Mode

The diagnostic can only be acknowledged if it is no longer present. It is only possible to clear diagnostics via the web server if the bus node has no Ethernet/IP connection.

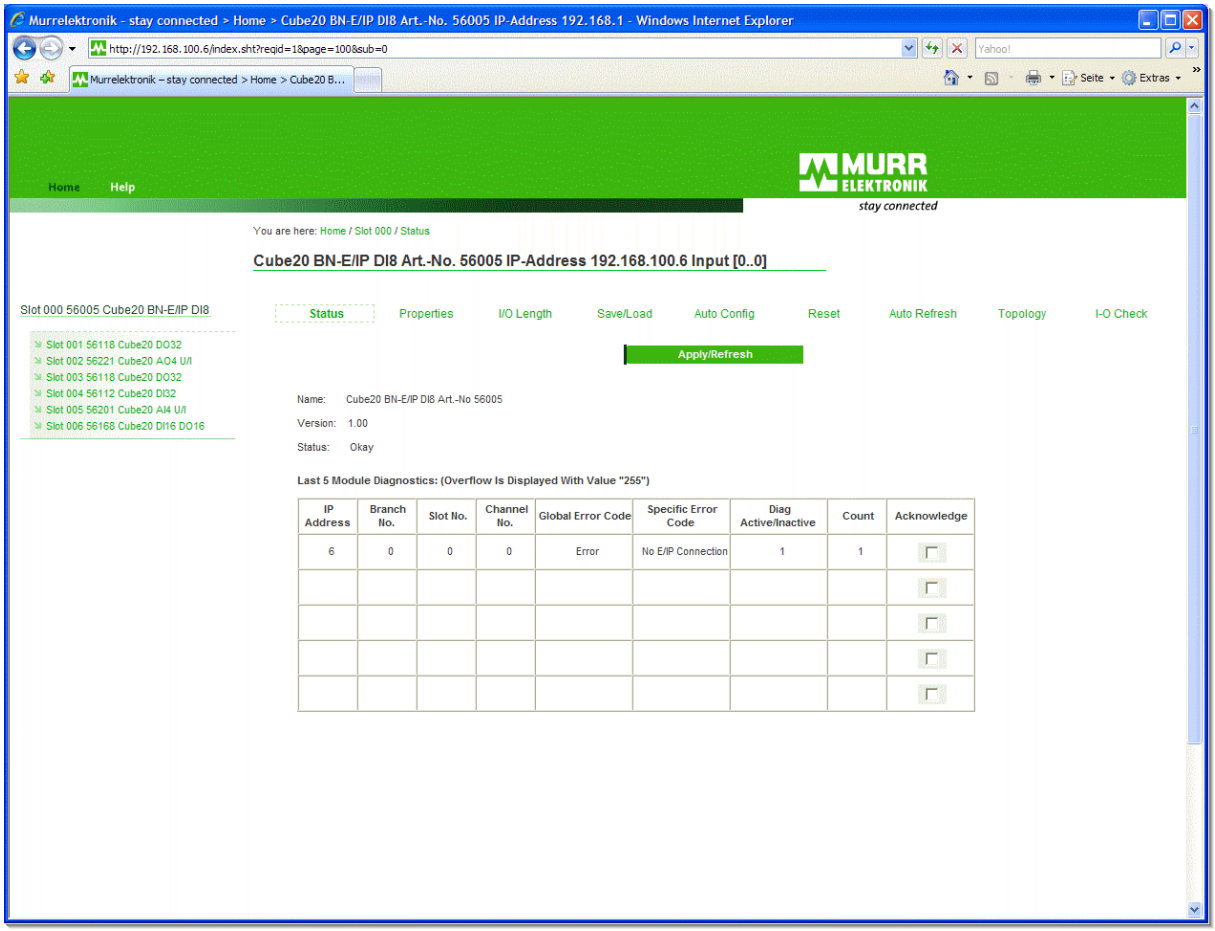


Fig. 19 "Diagnostic Buffer with Acknowledgment".

6.1.1.2 Slot 000 – Properties

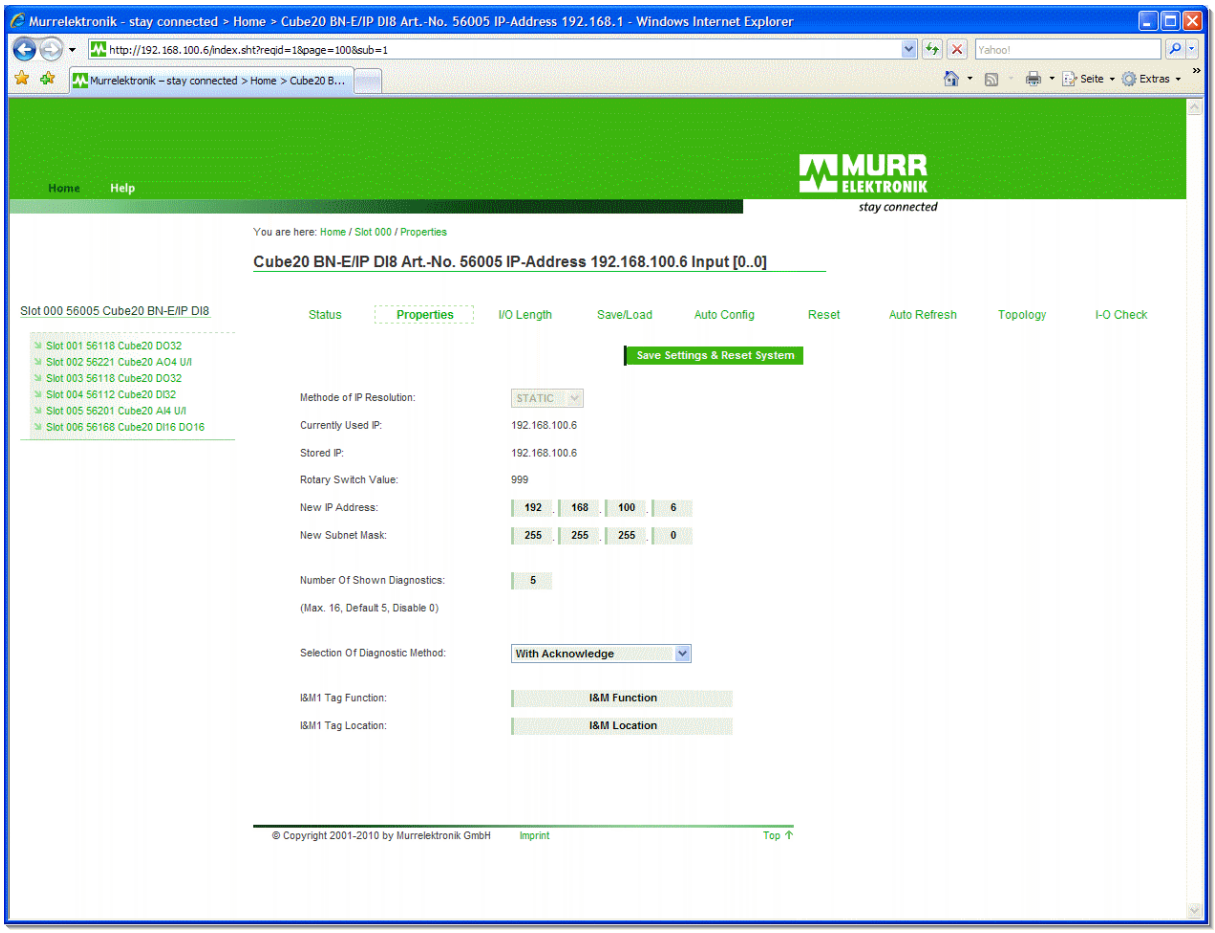


Fig. 20 Slot 000 - "Properties" bus node

You can modify system parameters to your requirements in the "Properties" submenu:

Display	Selection	Possible Values	
Method of IP Resolution	Protocol selection for the IP address.	STATIC	Static IP address (saved IP address)
		DHCP Protocol	IP address is obtained via DHCP.
		BOOTP Protocol	IP address is obtained via BOOTP.
New IP Address	Manual input of a new IP address.		
New Subnet Mask	Manual input of a new subnet mask.		
MAC-Address	Shows the MAC Address of the device	00-0F-9E-..-..-..	

Display	Selection	Possible Values
Number of Shown Diagnostics	Number of diagnostics displayed and sent together with input data.	Max. 16 inputs; length 8 bytes Default: 5 Disabled: 0
Selection of Diagnostic Method	Request diagnostic display with acknowledgment or without acknowledgment (see "Diagnostics" section).	Acknowledge: with acknowledgment No Acknowledge: without acknowledgment
Selection of I/O Length Mode	Selection of I/O Length Mode	True I/O Length: The data length leaves unchanged. Always Even I/O Length: With odd data length a byte is added.
	The function "Selection of I/O Length Mode" is available from software version 1.04.	
I&M Tag Function	Module function	Text field with 32 characters e.g. temperature measurement
I&M Tag Location	Designation of module location	e.g. switch cabinet

Tab. 18: Parameter Modification

Save the changes by clicking on "***Save This Setting And Reset System***".

Your settings are accepted after a system reset. The reset is executed with a delay of approx. 5 seconds.

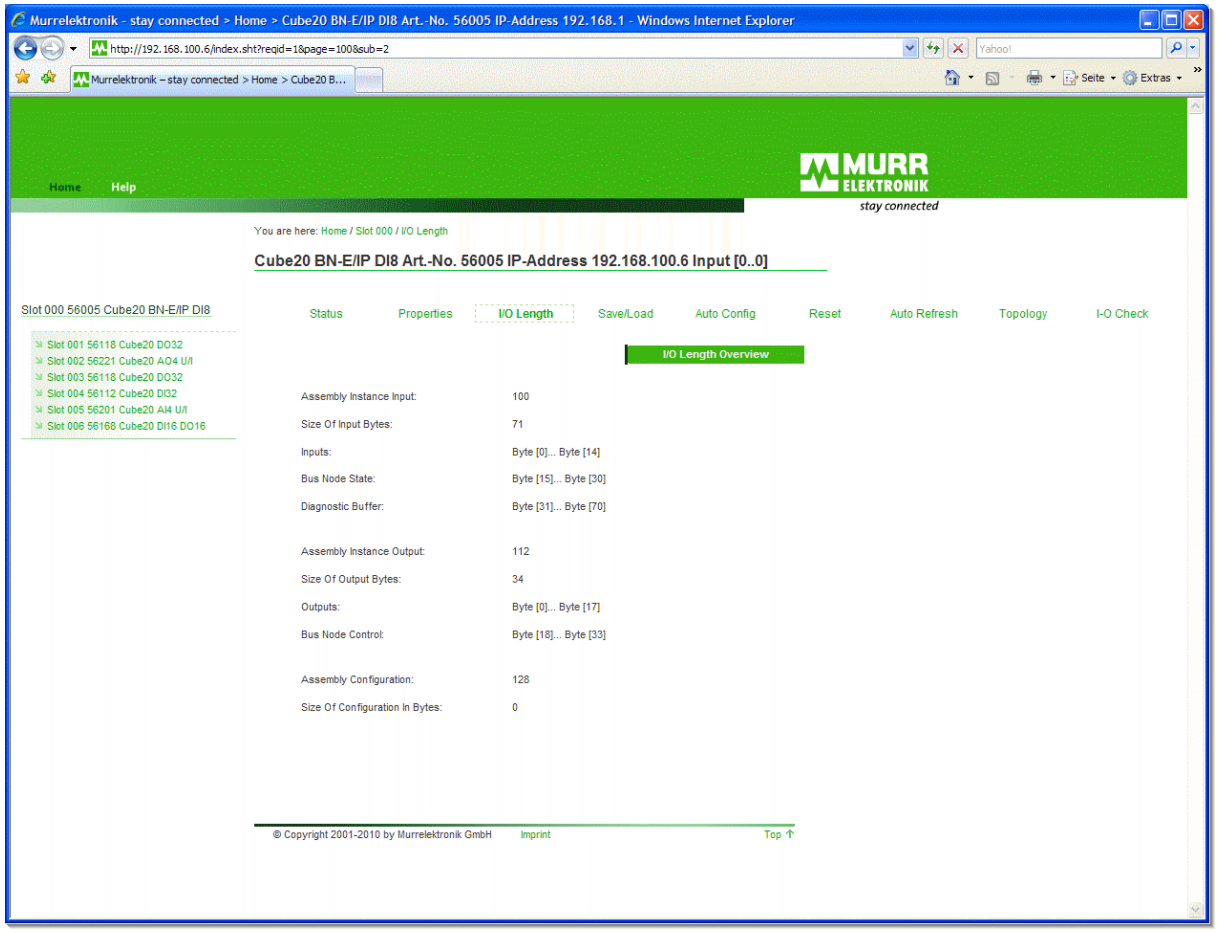
Please note that, depending on the rotary switch position, the "Method of IP Resolution" is not always selectable, or not all options are selectable.

The IP address or subnet mask must correspond to the actual network configuration. If you make a false input, you may no longer be able to reach your Cube20 system under certain circumstances. First contact your system administrator if you are uncertain.

It is possible to restore the factory setting using rotary switch position "998".

6.1.1.3 Slot 000 – I/O Length

This menu contains information on the system instances and data lengths used. They must be entered in RSLogix5000 accordingly (see section "Startup").


Murrelektronik - stay connected > Home > Cube20 BN-E/IP DI8 Art.-No. 56005 IP-Address 192.168.1 - Windows Internet Explorer
http://192.168.100.6/index.sht?reqid=1&page=100&sub=2
Home
Help
MURR ELEKTRONIK
stay connected
You are here: Home / Slot 000 / I/O Length
Cube20 BN-E/IP DI8 Art.-No. 56005 IP-Address 192.168.100.6 Input [0..0]
Slot 000 56005 Cube20 BN-E/IP DI8
Slot 001 56118 Cube20 DO32
Slot 002 56221 Cube20 AO4 U/I
Slot 003 56118 Cube20 DO32
Slot 004 56112 Cube20 DI32
Slot 005 56201 Cube20 AI4 U/I
Slot 006 56168 Cube20 DI16 DO16
Status
Properties
I/O Length
Save/Load
Auto Config
Reset
Auto Refresh
Topology
I-O Check
I/O Length Overview
Assembly Instance Input: 100
Size Of Input Bytes: 71
Inputs: Byte [0]... Byte [14]
Bus Node State: Byte [15]... Byte [30]
Diagnostic Buffer: Byte [31]... Byte [70]
Assembly Instance Output: 112
Size Of Output Bytes: 34
Outputs: Byte [0]... Byte [17]
Bus Node Control: Byte [18]... Byte [33]
Assembly Configuration: 128
Size Of Configuration In Bytes: 0
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Top

Fig. 21 Slot 000 - "I/O Length" Bus Node

The input and output data are listed bytewise according to their function. This provides a better overview. It also supplies you with quick and easy information on how the current configuration is arranged and how much I/O memory is required.

"I/O Length Overview" Button

When you click on this button, a new window opens. The table displayed contains an overview of the assigned bytes for each module and the byte position. If a module has only one byte input data, as shown in the figure below, the assignment is displayed as "0 … 0". Only Byte 0 is assigned. The next module occupies Bytes 1 to 4 in this example.

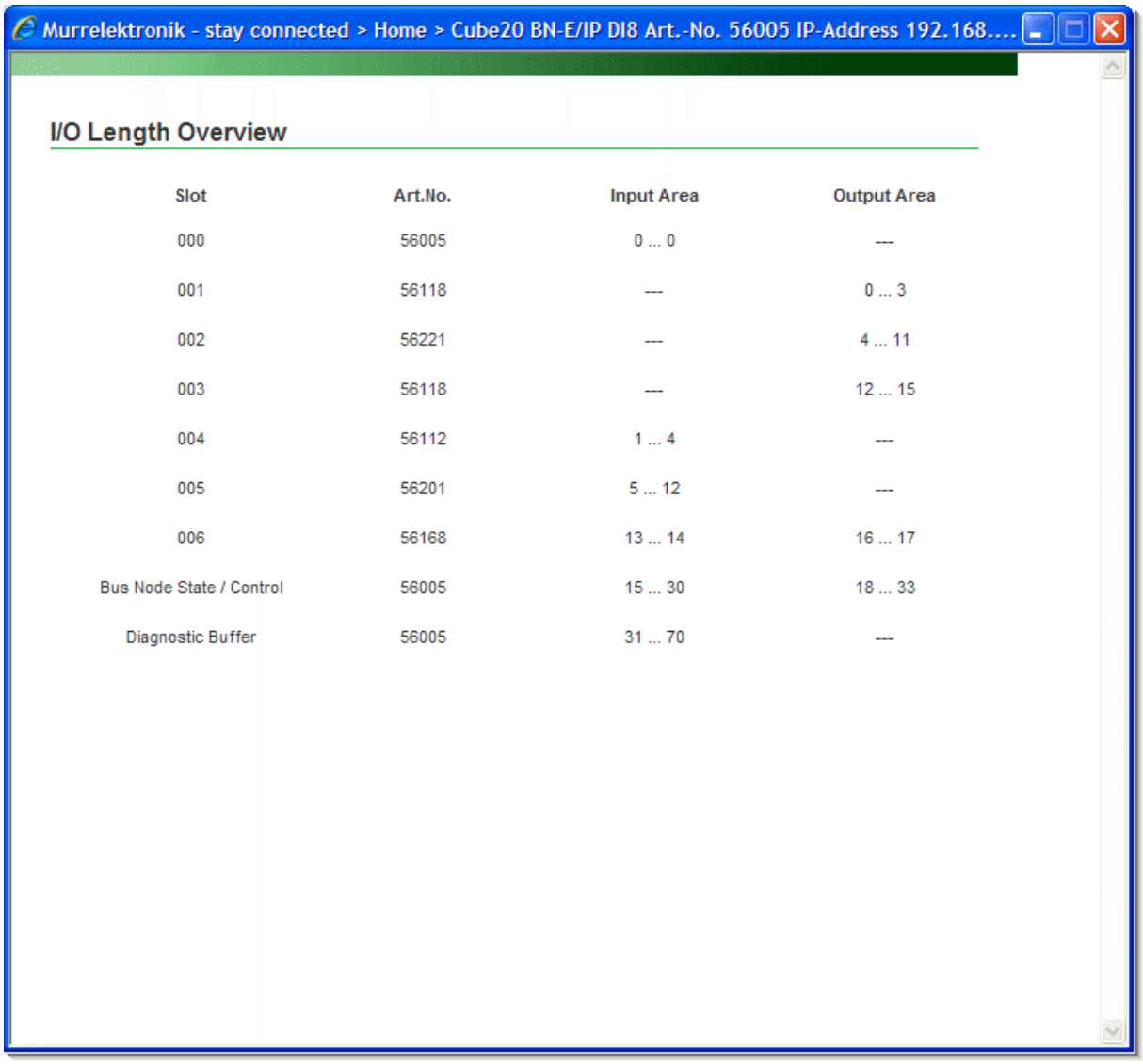

Murrelektronik - stay connected > Home > Cube20 BN-E/IP DI8 Art.-No. 56005 IP-Address 192.168....
I/O Length Overview
Slot | Art.No. | Input Area | Output Area
000 | 56005 | 0 ... 0 | ---
001 | 56118 | --- | 0 ... 3
002 | 56221 | --- | 4 ... 11
003 | 56118 | --- | 12 ... 15
004 | 56112 | 1 ... 4 | ---
005 | 56201 | 5 ... 12 | ---
006 | 56168 | 13 ... 14 | 16 ... 17
Bus Node State / Control | 56005 | 15 ... 30 | 18 ... 33
Diagnostic Buffer | 56005 | 31 ... 70 | ---

Fig. 22 I/O Length Overview

6.1.1.4 Slot 000 – Save/Load

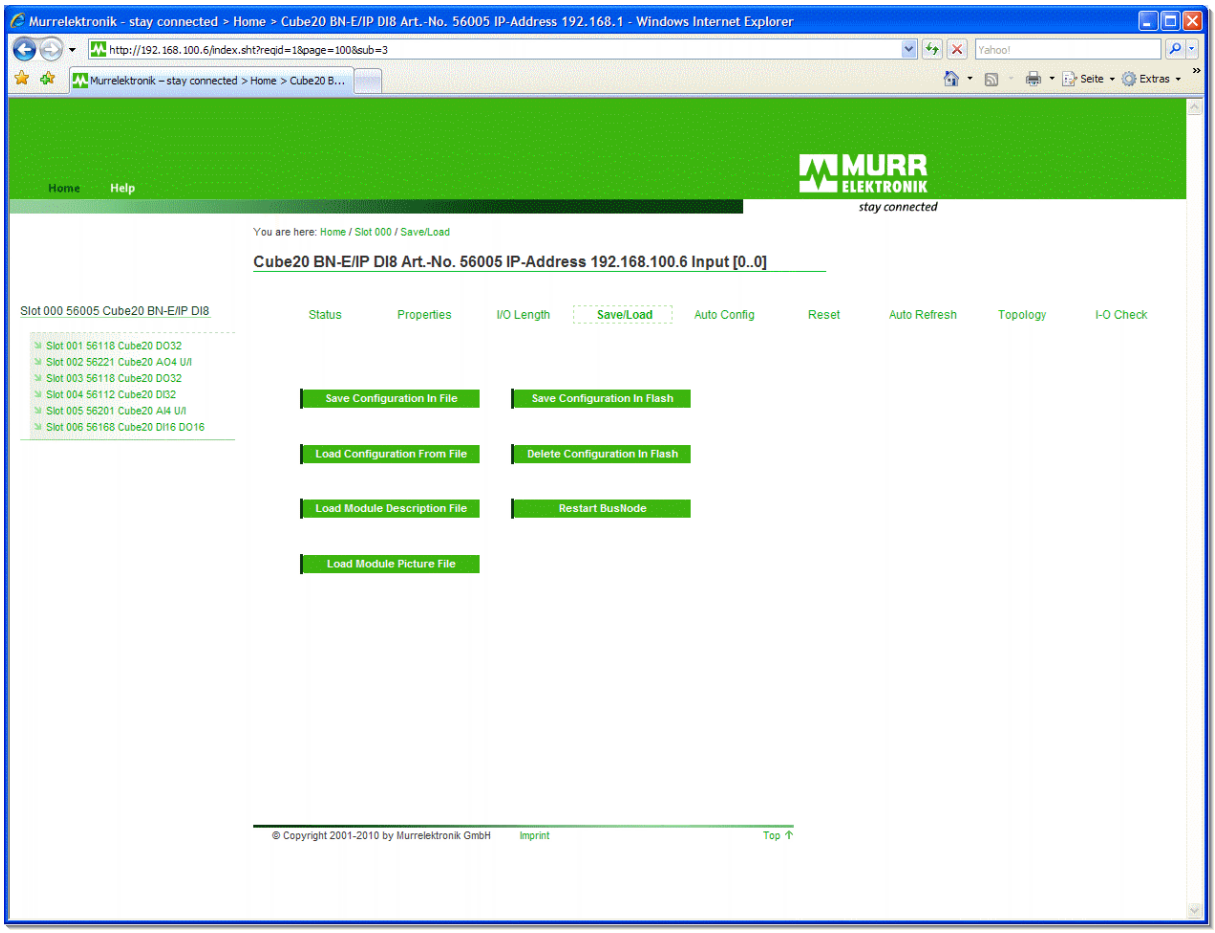


Fig. 23 Slot 000 - "Save/Load" Bus Node

Click on Button	Selection
"***Save Configuration To File***"	If you want to assign several Cube20 BN-E/IP systems with the same configuration and parameterization, you can save your current configuration and parameterization settings to a file on any medium or PC. This file can be transferred to another Cube20 bus node using Ethernet/IP. After file transfer, a time-delayed reset is triggered. The transferred configuration is saved.
"***Load Configuration from File***"	Loads a saved configuration file to a Cube20 bus node.
"***Load Module Description File***"	Loads the module description file to the web server. The file is downloadable from the Murrelektronik website at www.murrelektronik.com. The next website update includes a module display according to the description file.

Click on Button	Selection
"***Load Picture Description File***"	Loads the module picture to the web server. The file is downloadable from the Murrelektronik website at www.murrelektronik.com. The picture is saved in the web server. The pictures are expected in JPEG format. The picture size is limited to 230 Kbytes.
"***Save Configuration In Flash***"	Saves a completed configuration or parameterized modules in a non-volatile memory in the Cube20 bus node. Note: A saved configuration is overwritten.
"***Delete Configuration In Flash***"	Deletes your configuration or parameterization.
"***Restart Bus Node***"	Restarts the system.

Tab. 19: Selection on the "Save/Load" page

The web server functions "*Load Module Description File*" and "*Load Picture Description File*" are only required when modules that are unknown to the web server are connected to the bus node. Modules unknown to the web server are only displayed with Article Number, but without function parameters.

After a system reset, a configuration check is executed. If the saved and current module configuration at the bus node are identical, the saved data are accepted. Otherwise, the saved configuration is ignored and the current module configuration is used.

The Cube20 System currently in service is displayed. This may differ from the system that is saved in the Cube20 bus node.

The configuration file has only one format that is readable by the Cube20-BN-E/IP. When it is saved, the default filename "BNParameter.bin" is used.

CAUTION

Do NOT edit the configuration file.

Murrelektronik assumes no liability for malfunctions resulting from a manually edited file.

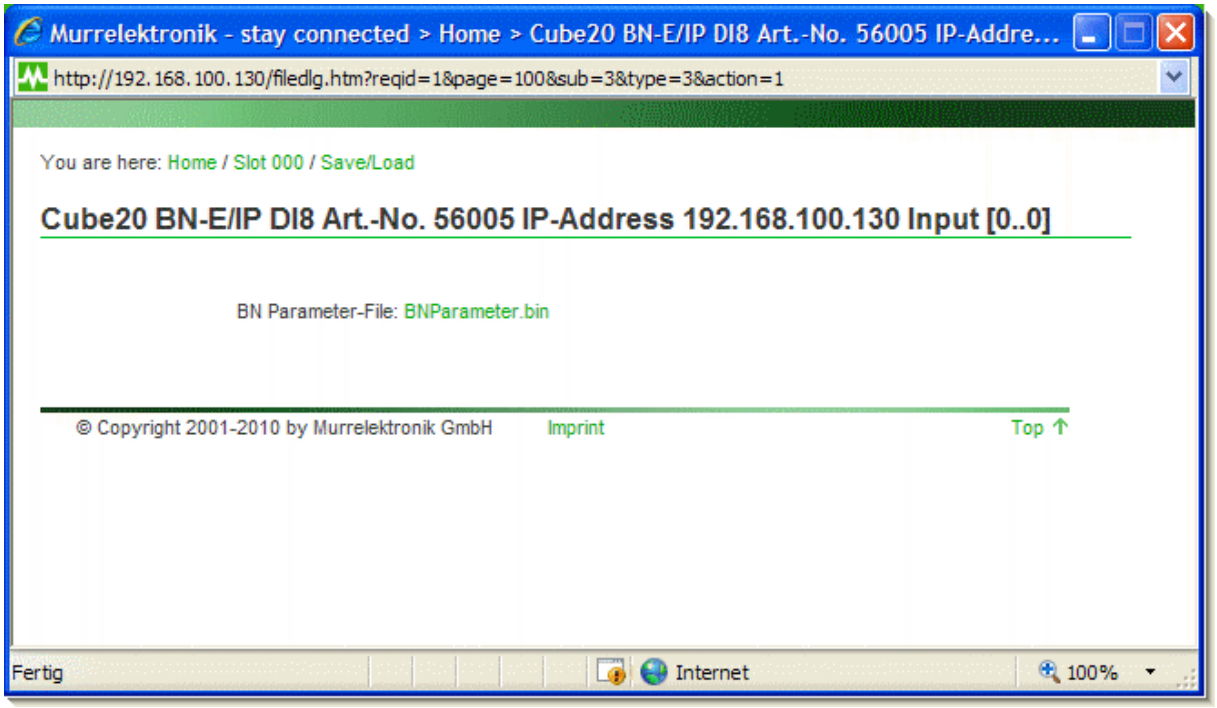

Murrelektronik - stay connected > Home > Cube20 BN-E/IP DI8 Art.-No. 56005 IP-Addre...
http://192.168.100.130/filedlg.htm?reqid=1&page=100&sub=3&type=3&action=1
You are here: Home / Slot 000 / Save/Load
Cube20 BN-E/IP DI8 Art.-No. 56005 IP-Address 192.168.100.130 Input [0..0]
BN Parameter-File: BNParameter.bin
© Copyright 2001-2010 by Murrelektronik GmbH
Imprint
Top
Fertig
Internet
100%

Fig. 24 Slot 000 - "Save/Load" Bus Node - "BNParameter.bin"

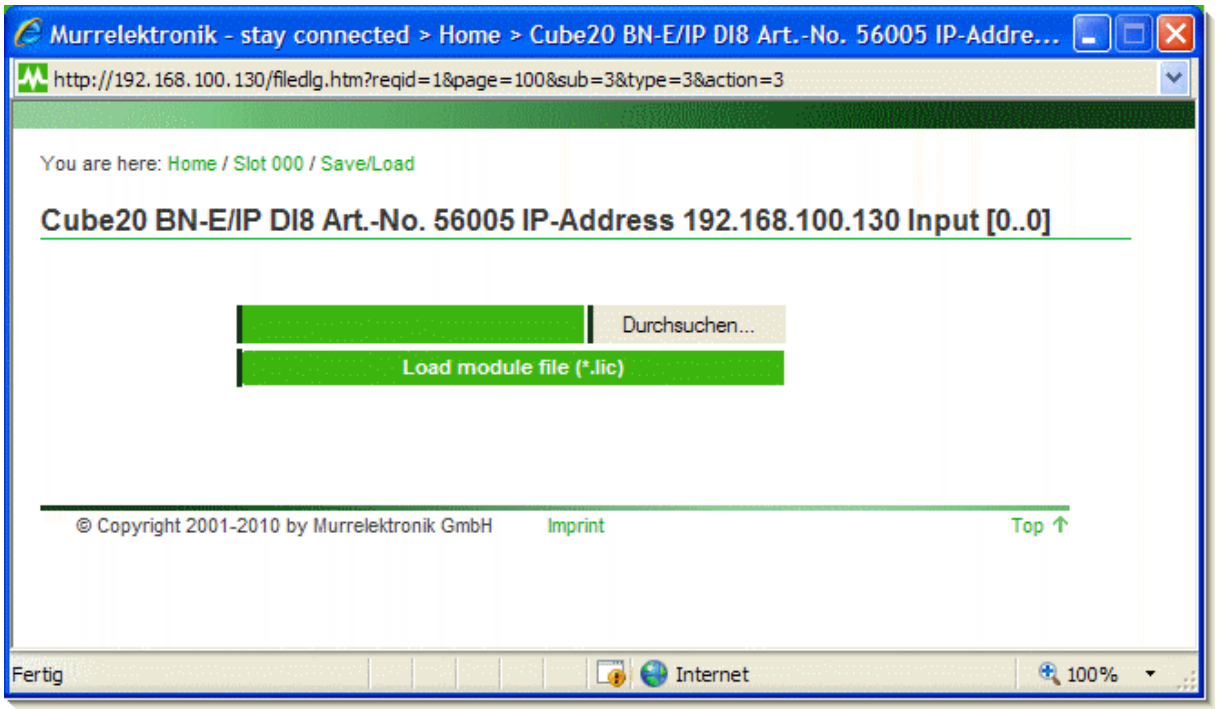

Murrelektronik - stay connected > Home > Cube20 BN-E/IP DI8 Art.-No. 56005 IP-Addre...
http://192.168.100.130/filedlg.htm?reqid=1&page=100&sub=3&type=3&action=3
You are here: Home / Slot 000 / Save/Load
Cube20 BN-E/IP DI8 Art.-No. 56005 IP-Address 192.168.100.130 Input [0..0]
Durchsuchen...
Load module file (*.lic)
© Copyright 2001-2010 by Murrelektronik GmbH
Imprint
Top
Fertig
Internet
100%

Fig. 25 Slot 000 - "Save/Load" Bus Node - "Load Module File (.lic)"*

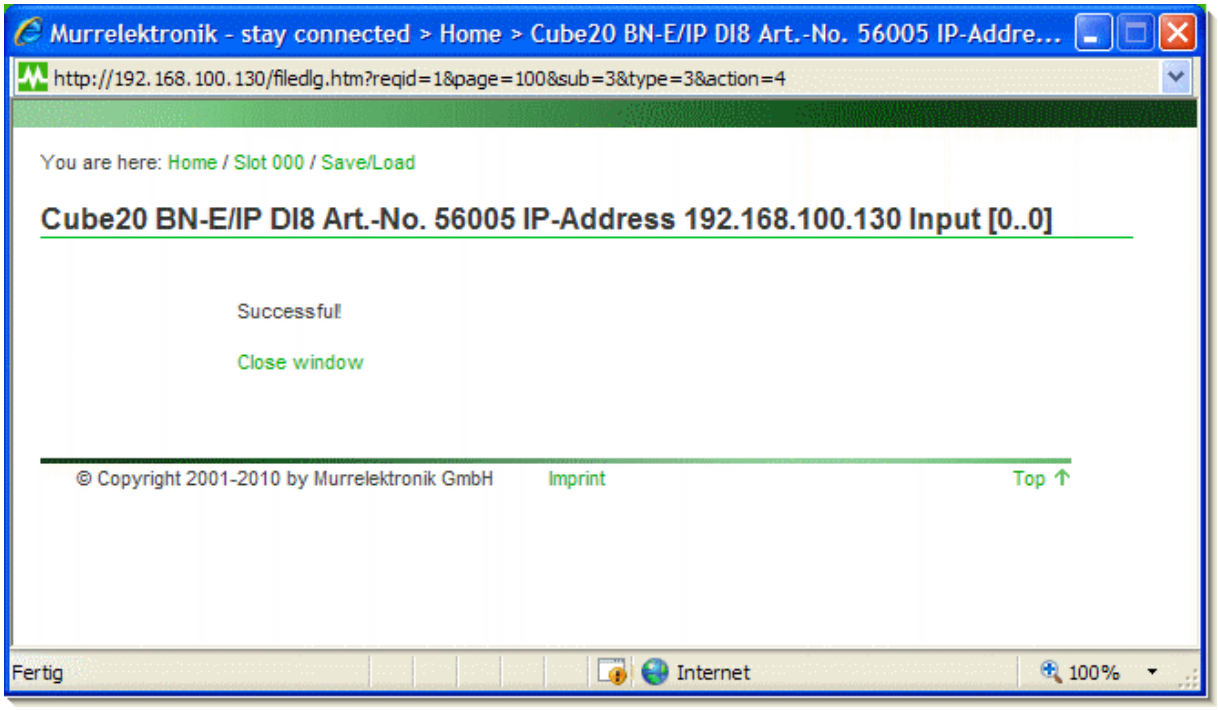


Fig. 26 Slot 000 - "Save/Load" Bus Node - "Successful"

When the description file is successfully loaded, the message in Fig. 26 appears. The data in the description file are accepted with immediate effect.

Update the page in order to display the new data.

6.1.1.5 Slot 000 – Auto Config

The Auto Config function can only be used in conjunction with Cube67 modules with multifunctional inputs and outputs and with Cube20/Cube67 Interface Art. No. 56140.

CAUTION

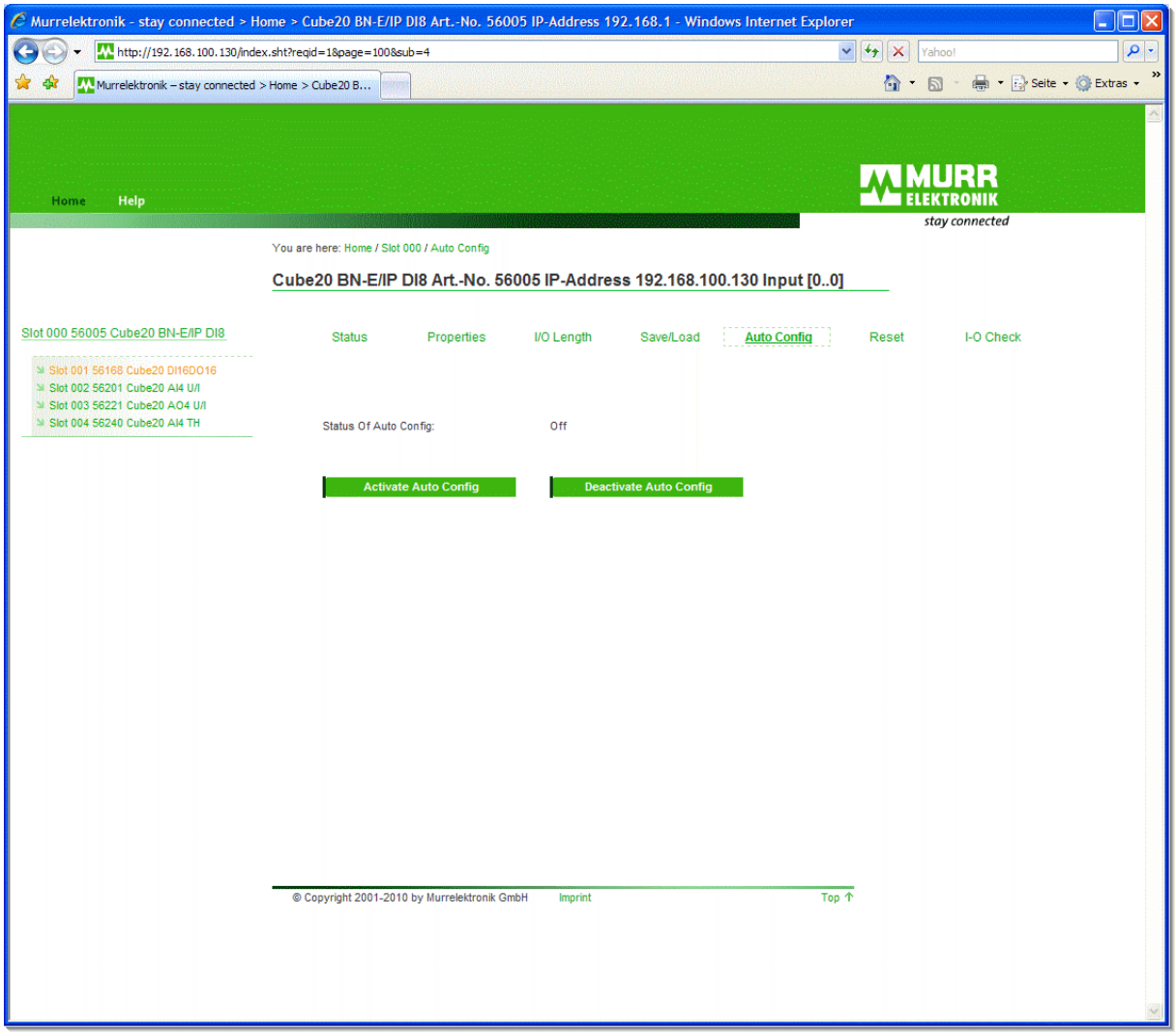
Risk of damage to assets owning to false data on multifunctional channels.

The Auto Config function parameterizes all inputs and outputs with immediate effect. All output data are accepted.

Do not forget to check the parameterization of Auto Config.

When the Cube20 Ethernet bus node is started for the first time, the function is activated. For the connected Cube67 modules, it means that they are parameterized automatically to "Normally Open Input". For multifunctional channels, it means that inputs are parameterized and set to outputs. This parameterization is retained until the next reset.

If you do not want to use the Auto Config function, deactivate it and save it in the bus node flash.


Murrelektronik - stay connected > Home > Cube20 BN-E/IP DI8 Art.-No. 56005 IP-Address 192.168.1 - Windows Internet Explorer
http://192.168.100.130/index.sht?reqid=1&page=100&sub=4
Murrelektronik – stay connected > Home > Cube20 B...
Home
Help
MURR ELEKTRONIK
stay connected
You are here: Home / Slot 000 / Auto Config
Cube20 BN-E/IP DI8 Art.-No. 56005 IP-Address 192.168.100.130 Input [0..0]
Slot 000 56005 Cube20 BN-E/IP DI8
Slot 001 56168 Cube20 DI16DO16
Slot 002 56201 Cube20 AI4 U/I
Slot 003 56221 Cube20 AO4 U/I
Slot 004 56240 Cube20 AI4 TH
Status
Properties
I/O Length
Save/Load
Auto Config
Reset
I-O Check
Status Of Auto Config:
Off
Activate Auto Config
Deactivate Auto Config
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Top

Fig. 27 Slot 000 - "Auto Config" Bus Node

Press Button	Selection
"***Activate***"	Activates the Auto configuration.
"***Deactivate***"	Deactivates the Auto Config function. The main window displays a confirmation in the form of "Auto Configuration Is Inactive" besides the "***Activate***" button.

Tab. 20: Selection on "Auto Config" page

The Auto Config function is only usable in conjunction with Cube67 modules.

6.1.1.6 Slot 000 – Reset

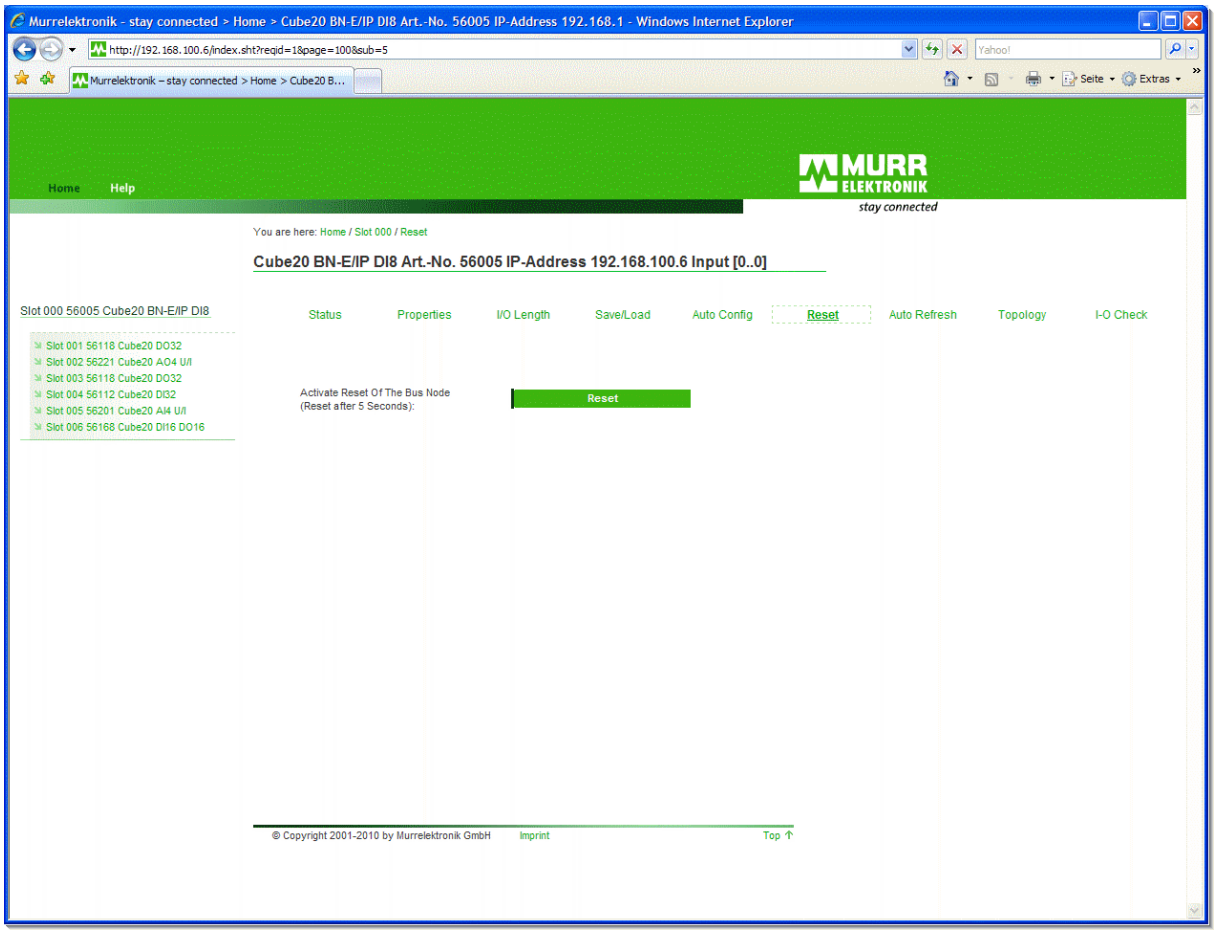


Fig. 28 Slot 000 - “Reset” bus node

Press Button	Selection
"***Reset System***"	Triggers a Cube20 system reset with a delay of 5 s. All line voltages are switched off and the connected modules are subjected to a hardware reset.

Tab. 21: Selection on "Reset" pate

6.1.1.7 Slot 000 – I-O Check

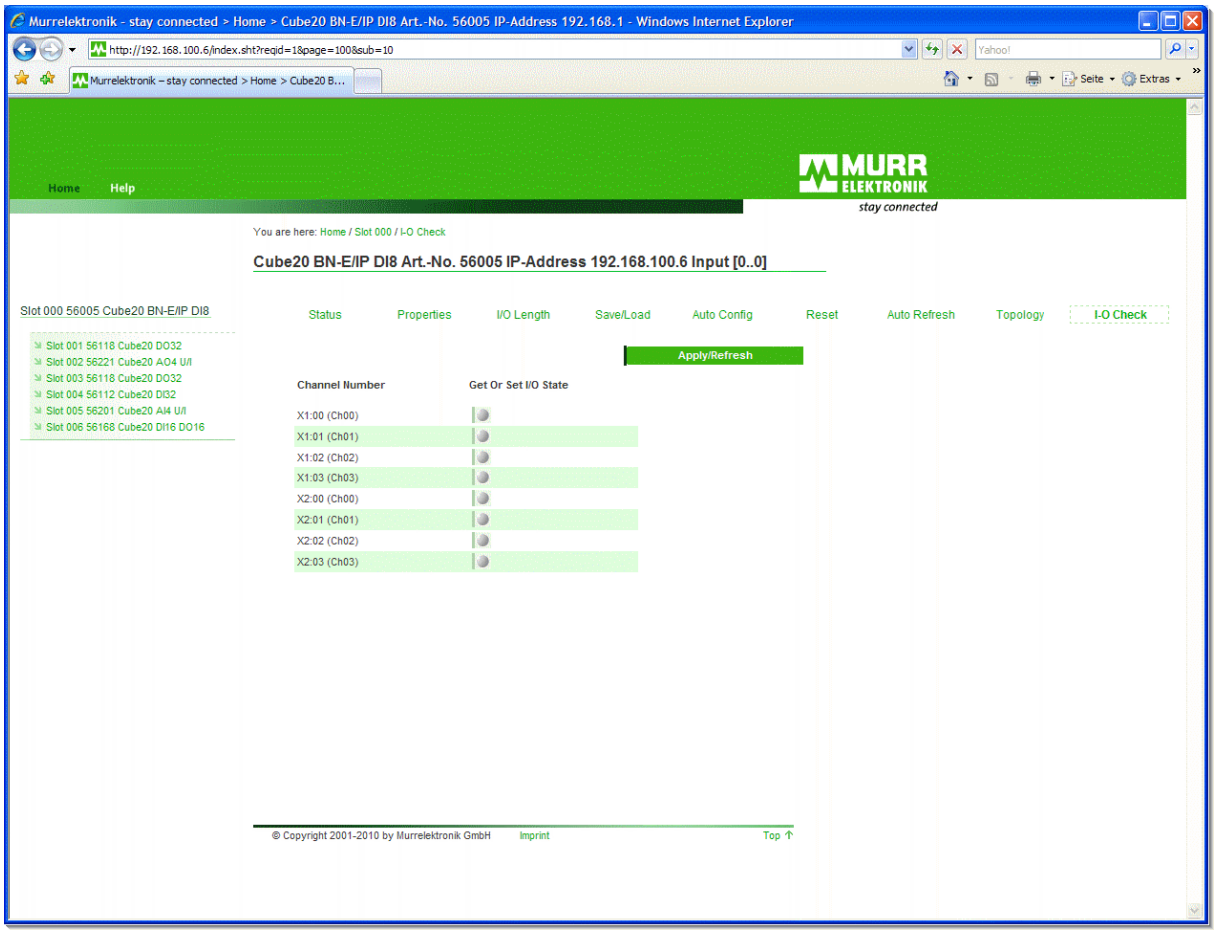


Fig. 29 Slot 000 – "I-O Check" Bus Node

- In the I-O Check menu option, you can observe the input status.
- Depending on the module, set outputs in the I-O Check menu option.
- With analog values, enter the hexadecimal value (starting with 0x) or write a decimal value.
- Click on "Apply/Refresh" to update the page. The output data are written to the bus node when you click on the "Apply/Refresh" button.
- If the bus node is in an Ethernet/IP link, it is impossible to set outputs.

A maximum of 16 channels are displayed on each page. If a module has more than 16 channels, the I/O Check is split into 2 pages.

6.1.1.8 Slot 000 – Auto Refresh

The "Auto Refresh" function permits you to update the contents of the loaded web page of the bus node in the background without the need for user intervention. The update time is adjustable in steps of 15 seconds and 2 seconds. The function is deactivated as default and the function state is not saved to the flash or the configuration file.

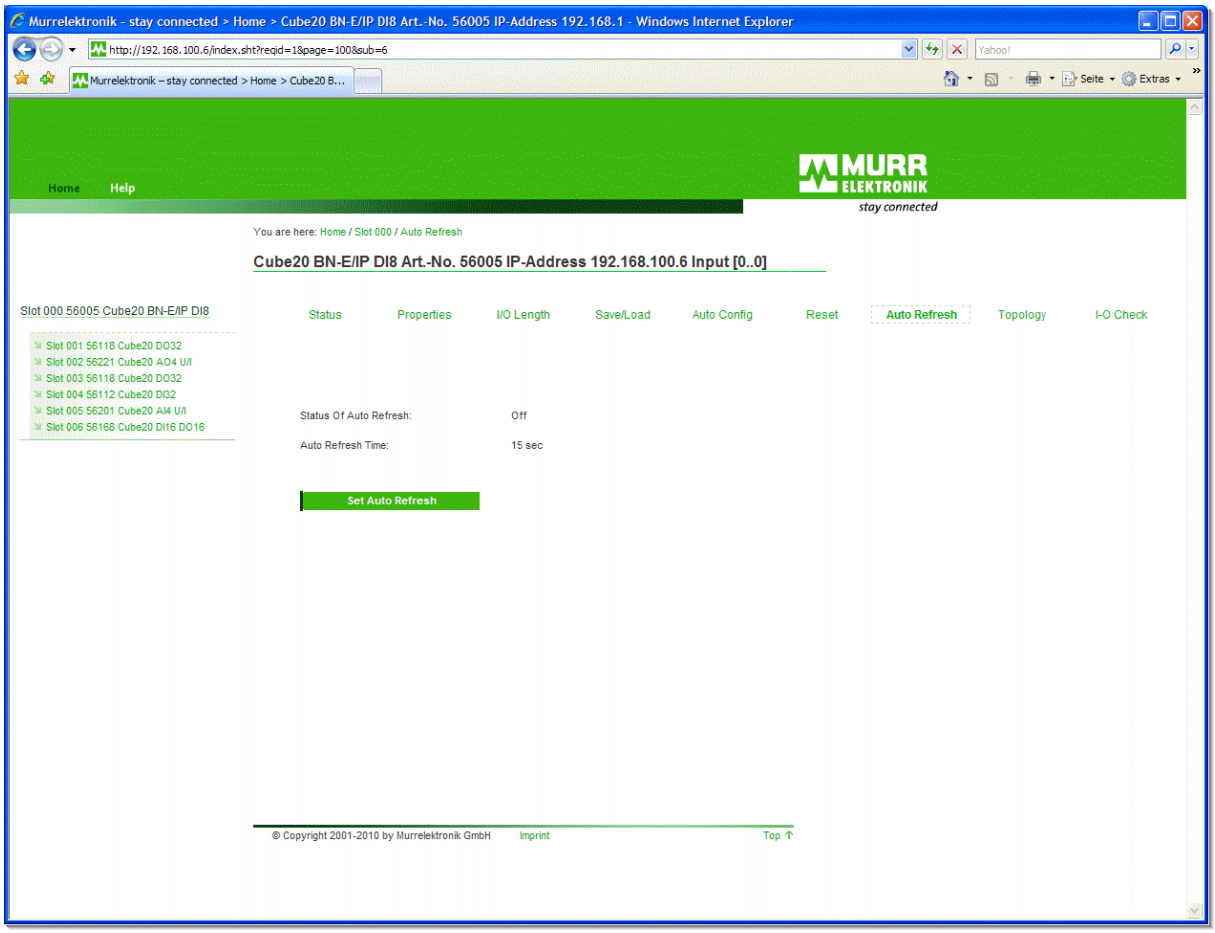


Fig. 30 Slot 000 – "Auto Refresh"

The following elements are updated via "Auto Refresh":

- Navigation bar
- Module status and diagnostic table
- Rotary switch position
- I/O Check table

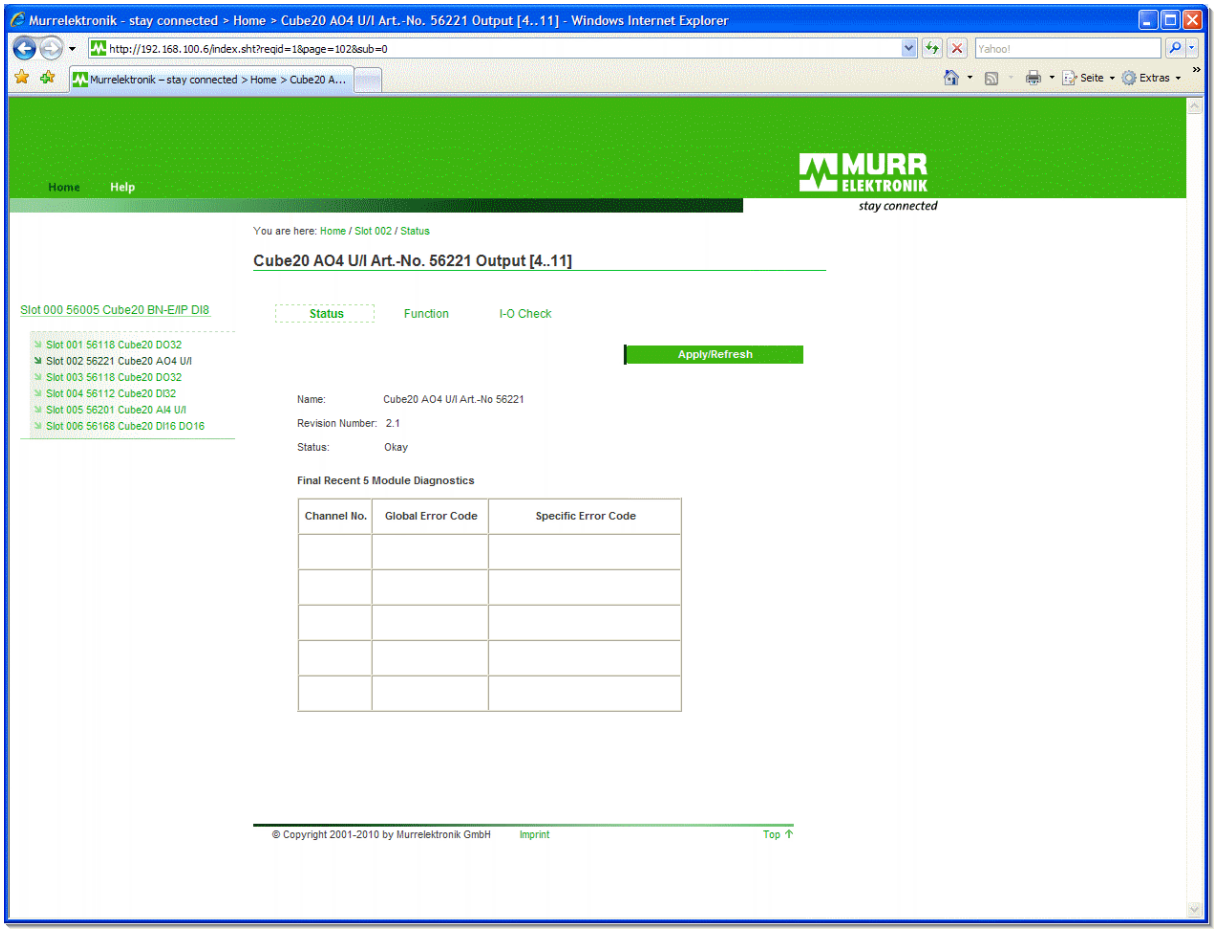
When you use the I/O Check table, note that entered output values may be overwritten by the "Auto Refresh" function. This affects in particular output values that are entered as numerical values.

Website elements may not be displayed in their correct position during an update procedure.

6.1.2 Menus from Slot 001 (Slot xxx) - Modules

6.1.2.1 Slot xxx – Module Status

The menu bar content is dependent on the module variant and comprises clickable menu options, e.g. Status, Function, I-O Check.


Murrelektronik - stay connected > Home > Cube20 AO4 U/I Art.-No. 56221 Output [4..11] - Windows Internet Explorer
http://192.168.100.6/index.sht?reqid=1&page=102&sub=0
Home
Help
MURR ELEKTRONIK
stay connected
You are here: Home / Slot 002 / Status
Cube20 AO4 U/I Art.-No. 56221 Output [4..11]
Slot 000 56005 Cube20 BN-E/IP DI8
Slot 001 56118 Cube20 DO32
Slot 002 56221 Cube20 AO4 U/I
Slot 003 56118 Cube20 DO32
Slot 004 56112 Cube20 DI32
Slot 005 56201 Cube20 AI4 U/I
Slot 006 56168 Cube20 DI16 DO16
Status
Function
I-O Check
Apply/Refresh
Name: Cube20 AO4 U/I Art.-No 56221
Revision Number: 2.1
Status: Okay
Final Recent 5 Module Diagnostics
Channel No.
Global Error Code
Specific Error Code
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Top

Fig. 31 Module Status

The diagnostic table always shows the current diagnostic status of the module. A maximum of 5 diagnostics are displayed. As soon as diagnostic overflow takes place, inconsistencies may occur in the diagnostic display.

Display	Description	Possible Values
Name	Name of highlighted module	Cube20…
Version	Software version	2.1
Status	Module status	OK Faulty Failure
Table	The table shows the current diagnostic present on the module.	max. 5 diagnostics
I/O Check (1)/(2)	Reads/writes the inputs and outputs.	
Function	Parameterizes the module functions.	

Tab. 22: Screen views

Module settings that were entered in the "Function" link must be saved in the bus node flash before they are available after a voltage reset.

Status:

"Okay" → The module is free from defects.

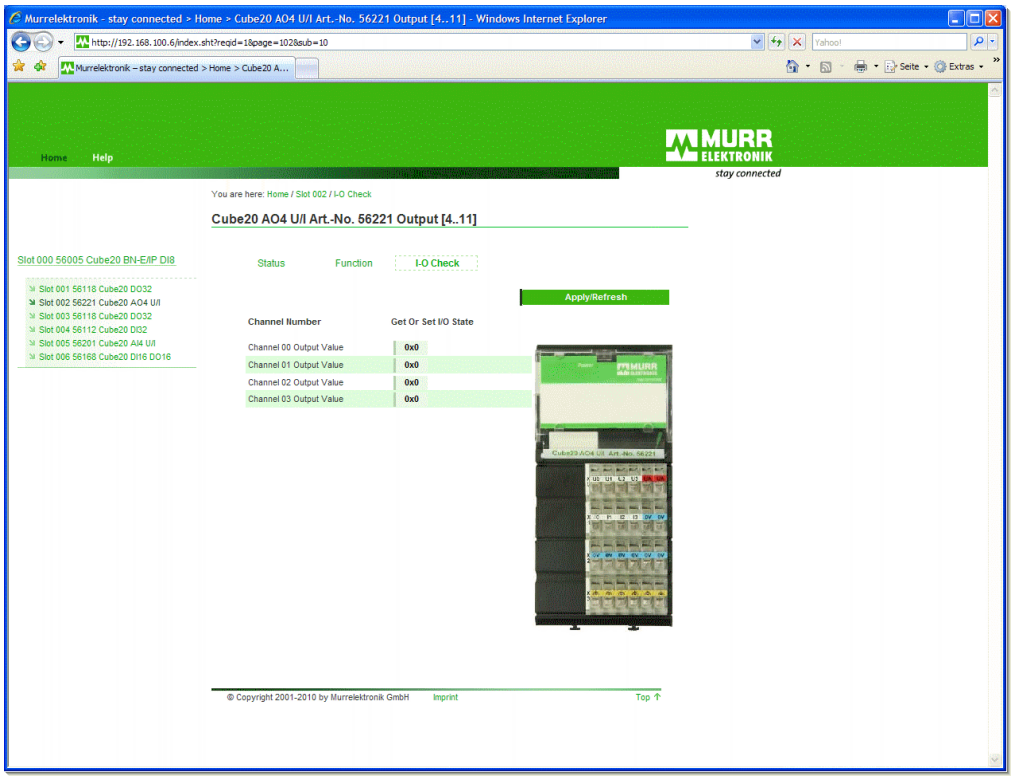
"Faulty" → The module has one or several diagnostics.

"Failure" → The module was removed from the internal system connection.

6.1.2.2 Slot xxx – I-O Check

If you have completed your parameterization or switched on Auto Config, you can subject the particular module to an I/O test in this menu option.

If inputs or outputs are switched on, they are displayed. If you want to switch on outputs, click on the appropriate button next to the module. To switch the module off again, click on the same button again.


Murrelektronik - stay connected > Home > Cube20 AO4 U/I Art.-No. 56221 Output [4..11] - Windows Internet Explorer
Home
Help
MURR ELEKTRONIK
stay connected
You are here: Home / Slot 002 / I-O Check
Cube20 AO4 U/I Art.-No. 56221 Output [4..11]
Slot 000 56005 Cube20 BN-E/IP DI8
Slot 001 56118 Cube20 DO32
Slot 002 56221 Cube20 AO4 U/I
Slot 003 56118 Cube20 DO32
Slot 004 56112 Cube20 DI32
Slot 005 56201 Cube20 AI4 U/I
Slot 006 56168 Cube20 DI16 DO16
Status
Function
I-O Check
Apply/Refresh
Channel Number
Get Or Set I/O State
Channel 00 Output Value
Channel 01 Output Value
Channel 02 Output Value
Channel 03 Output Value
0x0
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Top

Fig. 32 I/O Check of analog module in Slot 002

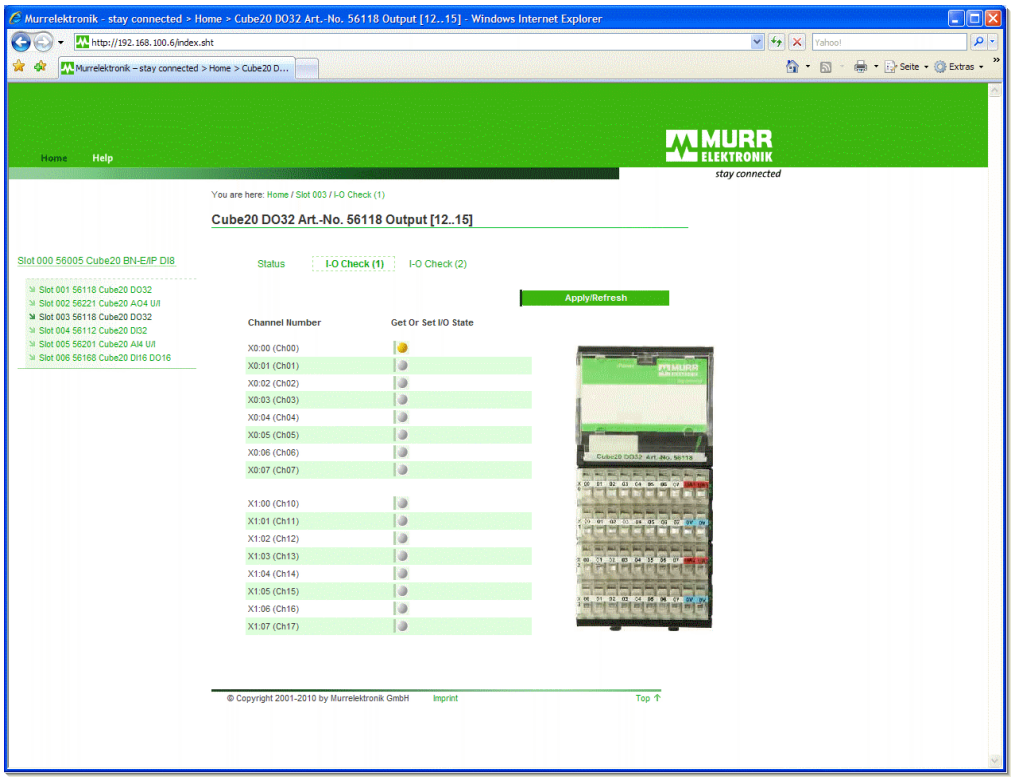


Fig. 33 I/O Check of digital module in Slot 003

6.1.2.3 Slot xxx – Function

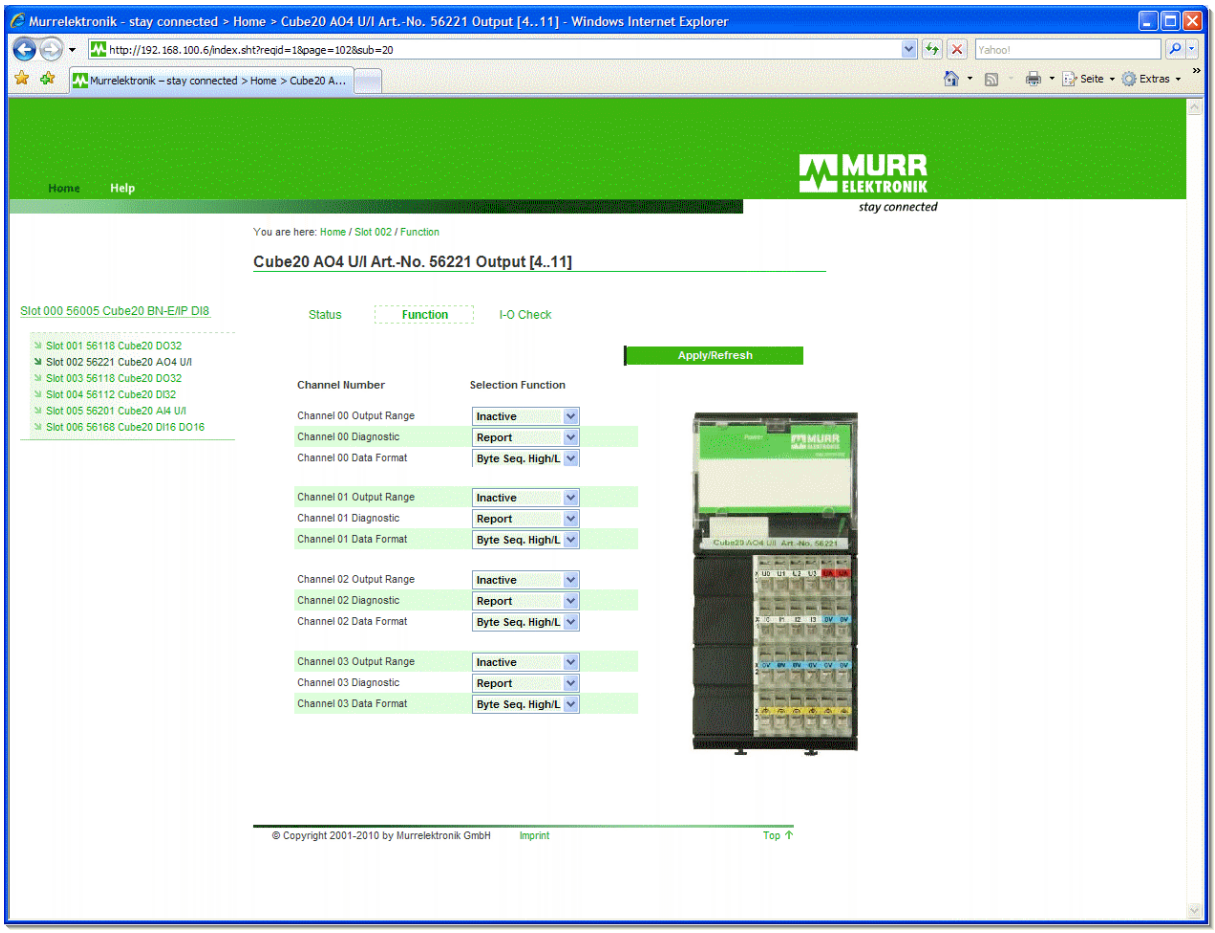
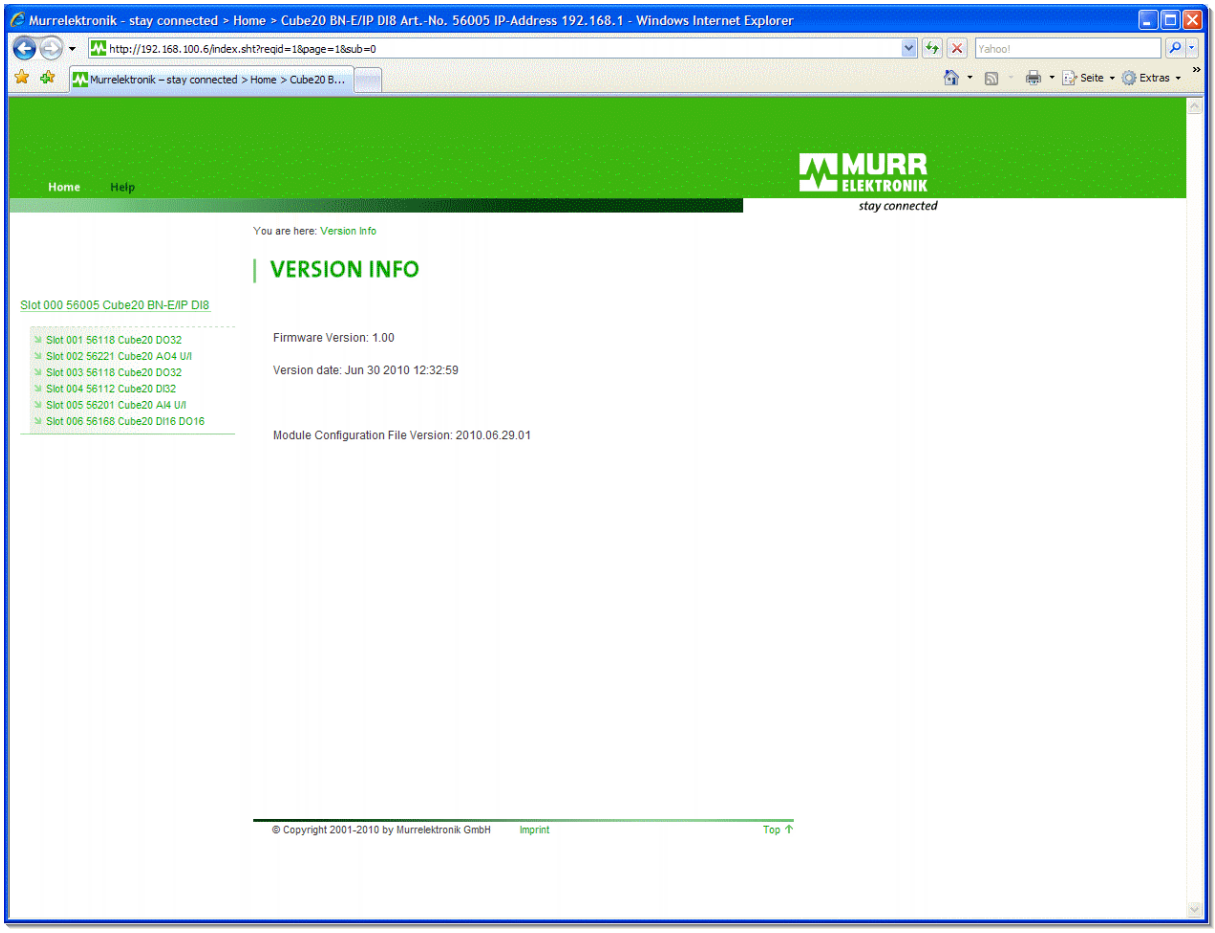


Fig. 34 Functions of the module in Slot 002

Various settings are possible dependent on the module variant. They are described in the module manual.

6.2 "Help" Menu Option

6.2.1 Version Info


Murrelektronik - stay connected > Home > Cube20 BN-E/IP DI8 Art.-No. 56005 IP-Address 192.168.1 - Windows Internet Explorer
http://192.168.100.6/index.sht?reqid=1&page=1&sub=0
Murrelektronik – stay connected > Home > Cube20 B...
Seite
Extras
Home
Help
MURR ELEKTRONIK
stay connected
You are here: Version Info
VERSION INFO
Slot 000 56005 Cube20 BN-E/IP DI8
Slot 001 56118 Cube20 DO32
Slot 002 56221 Cube20 AO4 U/I
Slot 003 56118 Cube20 DO32
Slot 004 56112 Cube20 DI32
Slot 005 56201 Cube20 AI4 U/I
Slot 006 56168 Cube20 DI16 DO16
Firmware Version: 1.00
Version date: Jun 30 2010 12:32:59
Module Configuration File Version: 2010.06.29.01
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Top

Fig. 35 Version information of the bus node

6.2.2 Help

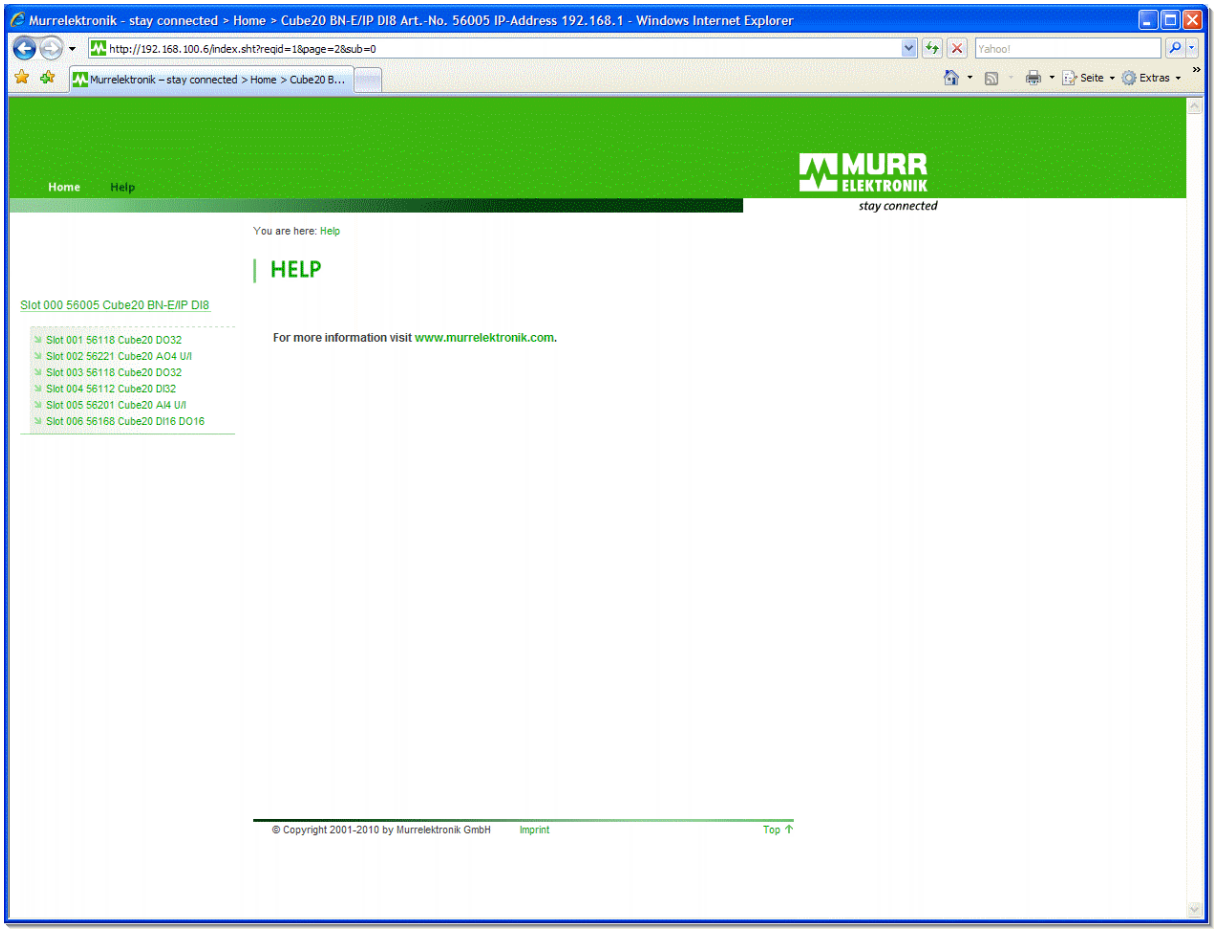
Murrelektronik - stay connected > Home > Cube20 BN-E/IP DI8 Art.-No. 56005 IP-Address 192.168.1 - Windows Internet Explorer
http://192.168.100.6/index.sht?reqid=1&page=2&sub=0
Murrelektronik – stay connected > Home > Cube20 B...
Home
Help
MURR ELEKTRONIK
stay connected
You are here: Help
HELP
Slot 000 56005 Cube20 BN-E/IP DI8
Slot 001 56118 Cube20 DO32
Slot 002 56221 Cube20 AO4 U/I
Slot 003 56118 Cube20 DO32
Slot 004 56112 Cube20 DI32
Slot 005 56201 Cube20 AI4 U/I
Slot 006 56168 Cube20 DI16 DO16
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Fig. 36 Help

7 Technical Data of 20 BN-E/IP DI8 Art. No. 56005

[Terminal X2] → 4 inputs or 4 outputs

[Terminal X3] → 4 inputs or 4 outputs

EMC	
EN 61131-2 Product standard	
EN 61000-4-2 ESD	Contact ± 4 kV, air ± 8 kV
EN 61000-4-3 RF-Field & GSM	10 V/m
EN 61000-4-4 Burst	± 2 kV
EN 61000-4-5 Surge	Asym./sym. ± 500 V; Asym. ± 1 kV
EN 61000-4-6 HF-asymmetric	10 V
EN 61000-4-8 Magnetic field 50 Hz	30 A/m
EN 55011 Emission	QP 30 dBµV/m (30 - 230 MHz) QP 37 dBµV/m (230 - 1000 MHz) (class B)
Ambient Conditions	
Operating temperature	0°C to +55°C
Storage temperature	-20°C to +85°C
Enclosure type according to EN 60529	IP 20
Mechanical Ambient Conditions	
Oscillation according to EN 60068 Part 2-6	5 g
Shock according to EN 60068 Part 2-27	15 g / 11 ms
Miscellaneous	
Dimensions (LxWxH)	117 x 56 x 47 mm
Mounting dimension (LxW)	117 x 56 mm
Weight	170 g
Bus Data	
Transfer protocol	Ethernet/IP
Transfer rates	10/100 Mbit/s, IEEE 802.3, Auto-Negotiation, half- or full Duplex by 10 and 100 Mbit/s available, automatically settings
Electrical isolation	500 V between bus and internal logic
ODVA Vendor ID	640 Dec

System connection	
Transfer protocol	Internal system
Addressing	Automatic
Connection Possibilities	
Internal system connection Out	10-pin male connector
Sensor and actuator supply	Cage clamp 2.5 mm²
Bus connection	RJ45
Sensor	2x4 terminal block connectors
Power Supply	
Operating voltage range logic U_B	18 ... 30.2 V DC
Current consumption (only, U_B)	150 mA
Sensor supply U_I	18 ... 30.2 V DC
Actuator supply U_A	18 ... 30.2 V DC
Reverse voltage protection module electronics	Yes
Reverse voltage protection sensor supply	Yes
Reverse voltage protection actuator supply	Yes
Overvoltage protection	Yes (suppressor diode)
Inputs	
Delay time for signal change	2 ms
Input characteristics	EN 61131-2, Type 2
Galvanic separation	500 V
Sensor power supply	
Max. current	0.7 A
Short circuit protection for sensors with automatic restart	Yes
Reverse polarity protection	Yes

8 Accessories

A list of Cube20 accessories is contained in the Cube20 System Manual.

**** Refer to our catalog or visit our online shop at www.murrelektronik.com***

Glossary

BN-E/IP	Bus Node-ETHERNET/IP
Byte	Equivalent to 8 bits
DI	Digital Input
DIN	Deutsches Institut für Normung (German Standards Institute)
I/O	Input/Output
EC Directive 2004/108/EC	EMC Directive.
EMC	Electromagnetic Compatibility.
EN	European Standard
ESD	Electrostatic Discharge
FE	Function ground
EDS	The device master file describes the technical features of an ETHERNET/IP product. This file is required to configure an ETHERNET/IP system and is provided by the device manufacturer.
I	Current
I/O	Input/Output
IEC	International Electrotechnical Commission
IGMP	Internet Group Management Protocol
IP20	Ingress Protection, protection degree to DIN EN 60529 1st digit = protection against contact and foreign bodies 2nd digit = protection against water 2: Protection against the ingress of solid foreign bodies above a diameter of 12.5 mm, protection against access by finger 0: No protection against inclusion
ISO	International Standard Organization
LED	Light Emitting Diode
LSB	Least Significant Bit.
FO	Fiber Optic

MSB	Most Significant Bit.
PAA	Process map of outputs
PAE	Process map of inputs
PELV	Protective Extra Low Voltage
Power-LED	LED to signal operating status
Pt 100	Temperature sensor on platinum base (0°C equals 100Ω).
+R	High potential sensor connection
-R	Low potential sensor connection.
RPI	Requested Packet Interval
S	Reference potential
Segment	Left segment of the internal system connection (Sockets 0 and 2) and right segment of the system link (Sockets 1 and 3)
SELV	Safety Extra Low Voltage.
TH	Thermocouple
TH	Low potential sensor connection.
TH+	High potential sensor connection
Type E, Type J, Type K, Type N, Type R	Thermocouples as per DIN EN 60584.
U	voltage
U/I	Voltage / current
US (brown terminal)	Sensor power supply (output)
UA (red terminal)	Actuator Power Supply
UB (red terminal)	Operating voltage
UI (red terminal)	Module and sensor power supply.
VDMA	Verband Deutscher Maschinen- und Anlagenbau e.V. (Association of German Machinery and Industrial Equipment Manufacturers)
VZ	Sign (+ or -)
ZVEI	Zentralverband Elektrotechnik- und Elektronikindustrie e.V. (German Electrical and Electronic Manufacturers' Association).

Cube20 specific

Sensor short-circuit	A short-circuit or overload at Terminal US ends up by triggering the self-resetting circuit-breaker. Every US socket has a separate circuit-breaker. A red LED indicates the error at the associated terminal. This fault is signaled via the diagnostic data contained in the input data. After rectifying the error, the sensor power supply restarts automatically.
Actuator disable	Short-circuit or overload at an output results in output switchoff. This fault is signaled via the diagnostic data contained in the input data. A red LED indicates the error at the associated terminal. The output restarts automatically.
Undervoltage	The voltages of the module / sensor power supply and actuator power supply are detected separately. If a voltage of 18 VDC is exceeded, this fault is signaled by the diagnostic data contained in the input data. If there is a module / sensor power supply undervoltage, the LED labeled "US" lights up red. If there is an actuator power supply undervoltage, the LED labeled "UA" lights up red. This diagnostic may be hidden due to the parameterization. In case of undervoltage in the module power supply, UB lights up.
No power	This error is reported by the diagnostic data contained in the input data if the power supply drops below 12 VDC.

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